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ANALYSIS OF WRITTEN PROBLEMS
IN A RECEPT AUTOMATIC SERIES

Submitted by

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B. S. in Ed., Worcester State Teachers College, 1940

In partial fulfillment of requirements for
the degree of Master of Education

1946

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CHAPTER I

INTRODUCTION

The science of numbers is at the basis of the development of all other sciences, which in turn account for the progress of civilization. This accounts for the importance placed on arithmetic by our ancestors. Also, it explains why arithmetic holds an important place in the school curriculum. Although arithmetic was one of the major subjects in the school curriculum, no serious study of the content and method of teaching the subject was considered necessary so long as the theory of formal discipline held sway. But when this theory began to be questioned, there arose a realization of a need for scientific studies of arithmetic material and procedure in order that the subject might be defended on the grounds of utilitarian and social values rather than on the grounds of disciplinary value. As early as 1908 and 1911, Stone^{1/} and Courtis^{2/} proved that there is but little correlation between accuracy in the combinations as such and in problems involving the same combinations. There have been numerous studies made of concrete problems. These studies have concerned themselves largely with

^{1/}C.W. Stone, "Arithmetic Abilities and Some Factors Determining Them," Teachers College, Contributions to Education (1908).

^{2/}S.A. Courtis, "Measurement of Growth and Efficiency in Arithmetic," Elementary School Teacher, 10: 56-74 and 177-199; 11: 171-185, 360-370, and 528-593.

the elimination of obsolete problems,^{1/} making problems of a more practical character,^{2/} the introduction of the project,^{3/} and the classification of concrete problems.^{4/} Butler^{5/} in 1924 pointed out the following four fundamental factors which influence the interpretation of concrete problems: 1. The ease with which the objective setting of the problem may be visualized; 2. The size of the numbers used in the problems; 3. Familiarity of terms used; 4. The sequence of like problems. Brownell and Stretch^{6/} in 1931 worked on a study which showed that the familiarity of the setting had an effect on the ease with which a problem could be solved. These studies show that although within the last fifty to one hundred years great interest has been shown in arithmetic textbooks, the written problem work still remains the most abused phase and is undapted to the needs and experiences of the pupils. Although there

^{1/}G.M. Wilson, "The Application of Scientific Methods to the Determination of the Curriculum in Arithmetic," Journal of Education, 91: 376-377 and 402-403.

^{2/}J.C. Stone, "The Modernization of Arithmetic," Journal of Education, 78: 541-542.

^{3/}M.E.B. Wilson, "Practical Lessons in Arithmetic," Journal of Education, 65: 233-234.

^{4/}D.E. Smith, "The Question of Problems in Elementary Mathematics," Educational Review, 31: 300-305.

^{5/}Frank A. Butler, "An Investigation to Discover the Fundamental Difficulties Met by Pupils in the Interpretation of Concrete Problems in Arithmetic." Unpublished Bachelor's Thesis, University of Wisconsin, 1924.

^{6/}W.A. Brownell and Lorena B. Stretch, Effect of Unfamiliar Setting on Problem Solving. Duke University Press, 1931.

have been many significant changes not only in the subject matter but also in the aim of instruction, the arithmetic with which the school children of today struggle does not differ in many respects from the "ciphering" of Colonial days. In tracing the history of arithmetic it is interesting to note that the concepts of present-day arithmetic are similar to those of Colonial days. It might be interesting to present a brief account of the historical development of arithmetic at this point.

Arithmetic at the time of colonization of this country was not considered essential to a boy's education unless he was to enter commercial life or certain trades. The nobility looked upon it as "'common,' 'vile,' 'mechanic,' because it was the accomplishment of clerks, artisans, tradesmen and 'others who bore no sign of heraldry.'"¹/ The period before 1821 in arithmetic was commonly called the "Ciphering" period. The prominent feature of the texts of this period was the large number of rules which were to be learned and directly applied to problems of trade and commerce. The solutions were required to be written and the subject was frequently called "ciphering" for this reason. In a general way the practical needs of trade and commerce were to be satisfied; this was the principal aim as is shown by the following titles of textbooks published in that period. James Hodder, That Necessary Art Made Easy was published in 1661. A quotation from the preface of this book

¹/Walter Scott Monroe, Development of Arithmetic as a School Subject. U.S. Bureau of Education, Bulletin No. 10, 1917.

shows the aim of the author, "And now for the better compleat-
ing of youth as to clerkship and trades I am induc'd to pub-
lish this small treatise of arithmetick." Isaac Greenwood in
1729 published Arithmetick, Vulgar and Decimal: With the
Application Thereof, to a Variety of Cases in Trade and Com-
merce.

Warren Colburn in adopting and applying Pestalozzi's
theories, marks a different purpose and plan in arithmetic in
America. Under Colburn arithmetic was given a place of
increased importance as a school subject, the content of the
text was abruptly changed, the aim was modified so as to
include mental training as an important factor, and much of
the instruction became oral. The disciplinary aspect of arith-
metic as developed by Colburn gave his interpretation of Pesta-
lozzi's theory of drill upon a set of abstract exercises solved
by the use of tables and other sensible objects. Colburn, in
applying the theory of mental development to arithmetic in
America, began in 1821 the period which Monroe has characterized
as "Arithmetic as Mental Discipline."

Today's trend is "Arithmetic for Social and Business
Usage." Thus, one might say that the pendulum is swinging
back to the basic aim of arithmetic in Colonial days, that is,
adapting it to the business needs of the community and life
situations of the pupils. The authors of the new arithmetic
books all claim that their books are based on the experiences
of the child and thus are more interesting to the pupils. As

an example let me quote from one of the more recent books^{1/}

"In their work of several years on this series of texts, authors and publishers alike have placed the demands of childhood in the front rank of preferred claims. This will explain the upward gradation of certain major topics; the systematic introduction of arithmetical processes in social situations familiar to children; the wide variety of projects, whose interest appeal is enhanced by hundreds of beautiful illustrations in three or four colors. These and other features of the books are the direct result of a sustained endeavor to smooth the way of the child to competence by a more natural and scientific approach."

True, the new arithmetic books are made more attractive by bright covers and many illustrations. Still, when one reads the problems, he finds that they are little, if any, different from the written problems of the disciplinary period. Following is an example of a problem from an old arithmetic book and one from a more recent book:

"Mrs. Smith is $\frac{3}{4}$ as old as Mr. Smith, who is 48 years old. Their daughter, Alice, is $\frac{4}{9}$ as old as her mother. How old is Alice?"^{2/}

"James went to his uncle's farm to spend the summer. His uncle gave him $\frac{5}{8}$ acre to plant in vegetables. He used about $\frac{2}{5}$ of it for beans. About what part of an acre did he plant in beans?"^{3/}

It is improbable that a wise uncle would give a 12-year old city child " $\frac{5}{8}$ acre of land" for vegetables. You can see from these illustrations that both problems are merely

^{1/}Clifford Woody, Frederick S. Breed, James R. Overman, Child-Life Arithmetics. Lyons & Carnahan. Chicago, Illinois, 1936, Introduction.

^{2/}E.L. Thorndike, New Methods in Arithmetic. Rand McNally and Company. Chicago, Illinois, 1921.

^{3/}Woody, Breed, Overman, Child-Life Arithmetics. Lyons and Carnahan. Chicago, Illinois, 1936, Book 6, p. 59, Example 2.

exercises in computing fractions. Neither problem is based on a real life situation, nor do they make any appeal to the average child. The recent texts contain miscellaneous lists of such isolated problems which tend to baffle and confuse the child by putting him in strange situations and generally requiring him to do figuring that he will seldom, if ever, use in real life. The assignment to children of problems of this nature defeats the real purpose of written problems, namely "to teach children to use numbers with ease and facility in actual life situations."^{1/}

Enough has been done with functional problems in arithmetic in recent years to suggest strongly the entire abandonment of the isolated textbook problem and its replacement by oral functional problem units. A few of these experiments may be reviewed to advantage. Following are some of the outstanding studies.

Lucy L. Hennigar^{2/} carried on an experiment with her children on working out a family budget. From this functional unit the children gathered information for planning a budget for a certain income and living within this budget. This is training children for adult life, for what child does not face the need of working out a budget when he is older?

^{1/}G.M. Wilson, M.B. Stone, and C.C. Dalrymple, Teaching the New Arithmetic. McGraw-Hill. New York, 1939, p.281.

^{2/}Lucy L. Hennigar, "Informational Units for a Sixth Grade; The Family Budget." Master's Thesis, Boston University, 1935.

Helen M. White^{1/} carried on an experiment in which she tested one thousand children in a six B grade in Providence, Rhode Island. She used twelve pairs of problems, one pair of situations familiar to the children, and the second pair of situations unfamiliar. Familiarity was determined not by the teacher above, but by a direct check upon the experiences of the children. In this study Miss White found that the lack of experience in the situation involved in the problem affected adversely the solution of the problem.

Olive C. Mahoney^{2/} has shown how first-grade children respond to the functional problem units. Miss Mahoney carried her first grade through numerous number experiences, such as games and toy shop. These children saw a reason for each use of arithmetic. The end of the year saw arithmetic and meaning so joined that there was nothing meaningless or formal to try to remember.

Elizabeth Quatlander^{3/} has shown how much arithmetic is involved in carrying on a cash book with a second grade. Besides the arithmetic involved, these children received good training in keeping a record of the money they earned and how

^{1/}Helen M. White, "The Relation of an Understanding of the Situation Involved in a Problem and Success in its Solution." Master's Thesis, Boston University, 1932.

^{2/}Olive C. Mahoney, "Extending First-Grade Experiences in Number." Master's Thesis, Boston University, 1938.

^{3/}Elizabeth Quatlander, "Replacing Systematic Drill with Informational Units in Second-Grade Arithmetic." Master's Thesis, Boston University, 1935.

it was spent. In addition to this, they learned an appreciation of the value of money.

Arithmetic is not an end in itself; it is a tool. To meet the demands of social utility, three phases of arithmetic need attention: "1. The basic experience which is necessary in order to make manipulative work meaningful; 2. The mastery for automatic reproduction of the useful number facts; 3. Training in application to life and business situations."^{1/} Morton^{2/} acknowledges that teaching children to solve problems is one of the most difficult tasks confronting the elementary school teacher. Much of the research of the past on written problems has yielded little profit because it assumed that the purpose of written problem work should be the solution of textbook problems. This fallacious assumption appears in the studies of Osburn and Drennan, Hyde and Clapp, Brownell and Stretch, Stearns, Knight, Washburn and Morphett, and Kramer.

The functional approach to written problems, as in the studies of Hennigar, White, Mahoney, and Quatlander, has been pursued also by Cummings, Russell, McMahon, Welch, Harap, Connor.^{3/}

The present study raises the question, How functional are the problems in a recent text series which in its

^{1/} N.E.A. Department of Superintendence, Third Yearbook (June, 1926) p.35-110.

^{2/} R.L. Morton, Teaching Arithmetic in the Intermediate Grades. Silver Burdett and Company. New York, 1938.

^{3/} See bibliography page.

introduction and advertising promises a wide departure from the formal and meaningless textbook problem current now for a full century (since the beginning of the mental development through arithmetic by Colburn)? Criteria will be set up, and in the light of these criteria each written problem appearing in the Woody, Breed, Overman Child-Life Arithmetic Series, Books 3, 4, 5, and 6, will be examined and classified. This series is the work of three outstanding educators, and at least one of the authors, Woody, has for years maintained a major interest in research in arithmetic. May it be, however, that one hundred years of formal problem work provides a tradition which these authors are unable to overcome? Puzzle problems have been eliminated; the most absurd figuring situations have been eliminated; but it may be that the work is still formal. The form of text problems is little changed in this series. How do the problems of the series classify themselves when carefully and critically scrutinized? That is the question which this study seeks to answer.

CHAPTER II

CRITERIA AND DELIMITATION

Some of the elementary school subjects have been entirely reworked. Two outstanding examples are reading and the social studies. A glance through any of the new basic readers shows how they have utilized situations that are real, vital, and meaningful for the child. In teaching the social studies, the teacher no longer uses one history or one geography book; rather she develops a social understanding through actual experiences. In the tool subjects of reading, spelling, writing, and arithmetic, limited basic skills should be developed and beyond that, the child should rely on reference usage and application of these skills in useful situations. In reading, the child is taught the basic reading skills and beyond that, he reads for information and enjoyment. Educators claim that the child needs to master only 2000 words in spelling. He should rely on the dictionary for the correct spelling of other words needed. In writing, the child is taught the correct form of the capital and small letters of the alphabet and the numerals from one to zero. Further work in writing is to develop greater and greater skill. In all these subjects quality is the aim and not quantity; yet in arithmetic, quantity is stressed as well as quality.

Just as our other curriculum experiences, number experiences

need to be based upon the purposes of the elementary school. It is the responsibility of elementary education to make it possible for each child to become increasingly effective in meeting situations, both in the present and in the future. The purpose of arithmetic is to develop the ability of the pupil to think quantitatively in the situations which he meets. Arithmetic can no longer be considered as merely a given set of facts and skill; experiences which are used to develop quantitative thinking must be associated with actual experiences. MacLatchy^{1/} states, "The function of the primary teacher is to supply as many situations as possible for the use of number." Gertrude Welch^{2/} makes the following statement: "Vital problem work of the newer practice is to be found in: school situations, life experiences, and integrating opportunities with units of work." These statements show that as the books increase in grade level and difficulty, so should the real situations involving actual life experiences increase.

The criteria for the setting up of written problems as stated by Wilson^{3/} are:

- "1. Providing additional drill material should be no part of the purpose of the problem. Most present textbook problems are disguised drill.

^{1/}Josephine MacLatchy, "Number Abilities of First-Grade Children," Childhood Education (May, 1935) 11: 344-347.

^{2/}Gertrude L. Welch, "A Fifth Grade Informal Problem Unit in Arithmetic on the Ordering and Distributing of Milk in the School," Education (April, 1941) p.459.

^{3/}Guy M. Wilson, "Criteria of the Written Problem in Arithmetic," Education (April, 1934) 59: 459.

2. The written problem work should not be subordinated to processes taught.
3. Wisdom and judgment in decisions on business matters--this is the real heart of the matter.
4. The problems are necessarily drawn from the community and subordinated to real experience.
5. This, of course, means that they must be sizable and pertinent for the group.
6. Figuring, as such, is secondary although essential. The teacher helps as needed.
7. It is true that this work, well done, provides fundamental motivation for drill, but that is not the purpose. The purpose is given in 3.
8. The setting up of written problem units to meet the requirements of these criteria becomes a matter of concern; it will require familiarity with pupils and community; it will require time. The development of one such motivated written problem unit will often take all class time on written problems for two weeks or a month."

Reading and the social studies have been entirely reworked. Arithmetic, however, has been slower. Three yearbooks in the last dozen years have supported the disciplinary theory and have slowed progress toward a better view. The main difficulty has been that teachers were entirely dependent upon the text, and it is still too commonly the practice to assign a given number of problems to be worked in a half or three-quarters of an hour. Authors are trying to improve texts by offering problems within children's understanding, but they appear to forget that it is real experience and actual need that are required. The social utility viewpoint has definitely gained ground in arithmetic and many recent texts have honestly been striving in this direction as shown by the titles. Titles such as the

following appear: Child-Life Arithmetics, Mathematics and Life, Daily Life Arithmetics. This analysis of the Clifford Woody, Frederick S. Breed, James R. Overman Series of Child-Life Arithmetics for grades three, four, five, and six, is made with the purpose of finding out what is actually between the covers, seeing if it meets the promises of its introduction, and comparing the problem work in these books with that of the old textbooks as well as with the newer functional problems. For this thesis a problem is defined as a situation encountered by the child which he wishes to solve.

The analysis, which is carried through separately for each book, is divided into five columns. In the first column is listed in alphabetical order the situation involved in the problems; in the second column is the frequency or total number of times such a situation occurs in the book; in the third column is the page on which the problem appears with the number of the example in red; in the fourth column is the process involved, that is whether it is addition, subtraction, multiplication, division, counting, or a combination of any of these; in the fifth and last column is the classification which is made under the following headings:

1. Sample. This is a type of problem which is solved for the pupil and is placed in the book as a guide for doing other problems of the same type. Example:

The Red Front market sells some cuts of meat at 24¢ a pound. How much money should be paid for 3 pounds (lb.) at that price?

To find how much should be paid for
 24 3 lb., multiply the price, 24¢, by 3.
 $\begin{array}{r} 24 \\ \times 3 \\ \hline 72 \end{array}$ Think: 3 times 4, 12. Write 2 under
 3 and remember 1.
 Think: 3 times 2, 6; 6 + 1 remembered,
 7.

Write 7 at the left of 2 in the product.

The product is 72.

72 cents should be paid for 3 lb.

2. Mere Exercise. This is a type of problem which employs none of the fundamental processes. As a rule it requires only the reading or writing of numbers. Example:

This is John's card. Read it the way you read Marie's card.

Name: John Thorpe
 Born: April 6, 1926
 Address: 1654 Park Street
 Telephone: Rosewood 7052

3. Fact Question. This is a type of problem which requires the pupil to apply tables of measures previously learned. Example:

There are 8 quarts in a peck. How many quarts are in 4 pecks?

4. Purely Artificial. This is a type of problem which requires the pupil to do figuring on a situation which is not of interest to him in his locality, which is beyond his understanding, and which is pointless. It is apt to be the exception when encountered in real life. Many times it is necessary to place problems under

this heading because they are such as to require the pupil to solve them in a manner not normally used in real life. Example:

Tom's father has 488 acres of corn land.
He wishes to make 8 equal farms of it.
How many acres should be in each farm?

5. Possible (but improbable). This is a type of problem which requires the child to figure on a situation which might be within his understanding and which he could encounter in real life in certain communities. To make these problems into real situations would require changing the figures to agree with those of the locality or situation involved, such as the cost of articles and weighing of pupils. Also, the problem would have to be given in connection with a worthwhile functional problem unit. Example:

Mary should weigh 81 pounds. She weighs only 69 pounds. How much must she gain to be the right weight?

6. Real Situation. This is a type of problem which requires the pupil actually to do something within his scope of comprehension and has as its motivating force pupil interest. Example:

Draw a plan on the floor of your room for the game, Tossing the Ring. Make the lines in your plan like the lines in the picture.

DETAILED ANALYSIS
of the
PROBLEMS in BOOK III
CHILD LIFE ARITHMETIC SERIES

Situation

Ages, find difference in

Airplanes, miles one can fly in an hour

seen on way to school

Animals, cages in the circus parade

wooden ones received

Apples, bushels sold

money received for apples sold

mother needs for a pie

number bought for a specified sum of money

number children brought for fruit show

number in a basket

number sold

shared equally

Automobiles, cost of toy ones

seen at crossing

toy ones the boys are making

Balloons, number Jack had left

Bank, started account in

depositing money to account in

withdrawing money from account in

Baseball, number of players on the team

number of runs the team made

Baskets, children filled for Thanksgiving

Beads, number of colored ones on a string

Frequency	Page and Example	Process	Classification*
1	63 ³	Subtraction	Purely artificial
1	232 ⁴	Multiplication	Purely artificial
1	8 ¹	Addition	Sample
1	190 ¹	Multiplication	Possible
1	43 ³	Addition	Possible
1	178 ²	Multiplication, addition	Sample
1	214 ²	Division	Sample
1	183 ⁴	Multiplication	Purely artificial
3	206 ² 208 ³ 216 ¹	Division	Possible
2	69 ^{1,2}	Addition	Possible
1	79 ¹	Subtraction	Purely artificial
1	205 ¹	Division	Sample
1	39 ⁴	Counting	Possible
1	175 ⁴	Multiplication	Purely artificial
1	8 ⁴	Addition	Possible
1	192 ⁶	Multiplication	Possible
1	63 ²	Subtraction	Purely artificial
1	162 ¹⁰	Multiplication	Purely artificial
1	147 ¹	Addition	Purely artificial
1	147 ²	Subtraction	Purely artificial
1	186 ¹	Multiplication	Possible
1	228 ⁴	Addition	Possible
3	64 ¹ 64 ^{2,3}	Addition Addition	Sample Possible
1	218 ⁸	Division	Purely artificial

*See page 13

Situation

Berries, Fred picked

quarts four boys picked

Bedroom, sets the store bought

Bicycle, Joe earned money to buy

Birds, colored pictures of

number seen in one day

Blocks, number a child walks to school

sets brought in

Books, chapters read in

finding number of new ones needed

finding number of pages read in

finding pages in

number of pages in

money needed to buy

worn ones taken away

Boys, in a race

in the parade

tents needed for

Bread, loaves possible to buy

Butter, amount bought in one month

Cake, number of pieces needed

Camp, number of days spent in

Fre- quency	Page and Example	Process	Classification
1	233 ³	Multiplication	Sample
1	194 ²	Multiplication	Purely artificial
1	197 ²	Multiplication and addition	Sample
1	225 ⁷	Division	Purely artificial
1	221 ²	Division	Possible
1	165 ¹	Subtraction	Possible
1	165 ⁶	Multiplication	Possible
1	43 ²	Addition	Possible
3	101 ^{4,5,6}	Reading Roman numerals	Possible
3	28 ^{1,2} 28 ³	Subtraction making problems	Sample Possible
3	128 ¹ 129 ² 176 ¹	Addition Multiplication and addition	Sample Sample
7	41 ^{1,2,3,4,5,6,7}	Locating numbers	Mere exercise
1	213 ²	Division	Sample
1	29 ³	Subtraction	Possible
5	20 ¹ 21 ² 21 ^{3,4,5}	Subtraction Subtraction	Sample Possible
1	79 ⁶	Subtraction	Possible
1	198 ¹	Multiplication	Sample
1	222 ³	Division	Possible
1	210 ⁵	Division	Possible
1	103 ⁵	Addition and multiplication	Purely artificial
1	29 ⁷	Subtraction	Possible
1	162 ¹¹	Multiplication	Possible

Situation

Candy, shared equally

Candy bars, cost of

number of squares in

number that can be bought with a given amount

Carfare, amount of money spent for

Celery, cost of a given number of bunches

Chart, finding sums on

made for attendance

made for cost of stamps

made for cost of tickets

made for prices of articles

Cherries, amount paid for two quarts

Chickens, number in the chicken yard

Children, coming in Mrs. Smith's car

coming with teacher

crossing the street

counting them as they march

in reading groups

marching in rows

meeting boys

Class, number of pupils in

Classmates, counting them

Clocks, reading figures on

Clothes, amount needed to buy

Frequency	Page and Example	Process	Classification
1	39 ³	Counting	Possible
3	159 ¹ 171 ⁹ 183 ²	Multiplication	Possible
1	211 ¹	Counting	Mere exercise
2	216 ⁴ 220 ³	Division	Possible
1	162 ¹⁴	Multiplication	Possible
3	230 ^{1,2,3}	Multiplication	Purely artificial
3	46 ^{1,2,3}	None	Mere exercise
1	53 ¹	Reading	Mere exercise
2	180 ^{1,2}	Reading	Mere exercise
1	160 ⁴	Reading	Mere exercise
7	157 ² 166 ³ 170 ¹ 181 ¹ 184 ² 205 ² 215 ²	Reading	Mere exercise
1	171 ¹	Multiplication	Possible
1	165 ²	Multiplication	Purely artificial
1	1 ³	Addition	Possible
1	1 ⁴	Addition	Possible
2	1 ^{1,2}	Addition	Possible
1	2 ¹	Counting by two	Mere exercise
1	23 ⁴	Subtraction	Possible
2	186 ⁵ 167 ²	Multiplication	Possible
1	8 ²	Addition	Purely artificial
4	75 ¹ 75 ^{2,3,4}	Addition Addition	Sample Possible
1	2 ²	Counting by three	Mere exercise
1	100 ¹	Reading time	Possible
1	202 ⁸	Subtraction	Purely artificial

Situation

Clothes, amount paid for
cost of

Coat hooks, in lockers in hall

Cookies, number baked

Corn, amount husked

Cost, of items listed

Crayons, cost of
number bought

Cup cakes, number that can be bought with given amount of money

Cups, making paper ones

Days, finding order of certain days
in a given number of weeks

Dishes, washing them for pay

Distance, number of feet boys can jump
number of feet from street to the garage

Dolls, number in the doll and money show

Dolls, at the party
dresses cut out for
given to cousins
money needed to buy
number the children have
paper ones cut out
sharing half with friend

Fre- quency	Page and Example	Process	Classification
2	63 ¹ 165 ⁵	Addition	Purely artificial
1	165 ⁴	Subtraction	Possible
1	202 ³	Multiplication	Possible
1	165 ⁸	Multiplication	Possible
1	167 ⁵	Multiplication	Purely artificial
12	107 ¹ 160 ¹ 165 ⁴ 162 ^{1,2,3,4,5,6,7,8,9}	Addition Counting by two Multiplication	Purely artificial Mere exercise Possible
3	159 ³ 171 ¹⁰ 231 ⁶	Multiplication	Possible
1	208 ⁶	Division	Possible
1	216 ³	Division	Possible
1	213 ¹	Division	Sample
3	2 ^{4,5,6}	Counting	Possible
5	171 ⁵ 231 ^{1,2,3} 192 ⁴	Multiplication	Possible
2	186 ⁴ 220 ⁴	Multiplication Division	Possible Possible
1	30 ⁷	Subtraction	Possible
1	218 ⁷	Division	Fact question
1	220 ⁶	Division	Possible
1	3 ¹	Addition	Sample
1	63 ⁷	Subtraction	Possible
1	19 ¹	Subtraction	Purely artificial
1	29 ²	Subtraction	Possible
1	228 ²	Division	Possible
1	30 ⁶	Subtraction	Possible
1	39 ²	Counting	Purely artificial

Situation

Dolls, tea cups for

Dolls beds given away

Doll house, number of chairs in

Dozer, number of half dozer in a
problems on

things that can be bought by

Easter card, cost of

given to cousins

Eggs, number found in the barn

finding the number of eggs in boxes

Examples, finding the number right in a test

Fares, collected from people on a street car

Farm, number of times visited

Fish, number in a market window

number the boys caught

Fishhooks, number the boys had

Flags, number in the bundles

number needed for class

Flowers, girls picked

Food, prices of

Fractions, finding number of fourths in articles listed

Game, drawing plan of on the floor

finding scores in

number of squares in

Frequency	Page and Example	Process	Classification
1	3 ⁶	Addition	Sample
1	19 ²	Subtraction	Purely artificial
1	19 ³	Subtraction	Purely artificial
1	35 ³	None	Fact question
7	90 ^{4,6,8,2}	Addition	Fact question
	99 ^{4,5}	None	Fact question
	99 ⁷	Subtraction	Fact question
1	99 ¹	None	Here exercise
1	131 ²	Multiplication	Purely artificial
1	210 ¹	Division	Possible
1	23 ³	Subtraction	Purely artificial
6	35 ^{1,2,4,5,6}	Counting	Possible
8	77 ^{1,2,3,4,5,6,7}	Addition	Possible
1	232 ³	Multiplication	Purely artificial
1	192 ⁵	Multiplication	Purely artificial
1	79 ⁷	Subtraction	Purely artificial
1	66 ²	Addition	Sample
1	66 ¹	Addition	Sample
1	234 ³	Multiplication	Possible
1	79 ⁸	Subtraction	Possible
1	212 ¹	Division	Possible
1	119 ¹	Addition	Possible
1	221 ¹	None	Here exercise
1	9 ¹	None	Real situation
5	10 ¹ 11 ^{2,3}	Addition	Sample
	11 ⁶ 12 ¹	Addition	Possible
1	9 ²	Counting	Real situation

situation

Game, placing the numbers in the squares
reading score board

Glass, in living room door

Gloves, number in pairs

Gold fish, bought at store

Grade, why called third grade

Graves, lunches brought

Grocery store, amount earned working in

Gym, number of pupils using

Haloween, finding cost of decorations
making problems about

Hens, total number of white and brown

Hours, number worked a day

Ice cream, cost of cones

number of bricks each store received

number of people one freezer serves

number of wafers needed to make sandwiches

Jacks, number played with

Jump rope, number of times jumped

Jump ropes made to sell

Kites, cost of

flying in air

money needed to buy

Lozons, number possible to buy with given amount of money

Lessons, number of examples in

Fre- quency	Page and Example	Process	Classification
1	9 ⁵	Writing numbers	Real situation
5	11 ^{4,5} 12 ^{2,7,4}	Reading numbers	Merely exercise
1	192 ⁷	Multiplication	Purely artificial
1	202 ⁷	Multiplication	Purely artificial
1	183 ¹	Multiplication	Possible
1	2 ⁷	None	Real situation
1	69 ⁴	Addition	Possible
1	186 ²	Multiplication	Possible
1	165 ³	Addition	Possible
3	38 ^{1,2,5}	Addition	Possible
1	38 ⁴	None	Possible
1	147 ³	Addition	Purely artificial
1	162 ¹³	Multiplication	Purely artificial
1	159 ⁶	Multiplication	Possible
1	222 ²	Division	Purely artificial
1	194 ³	Multiplication	Possible
1	174 ¹	Multiplication and addition	Sample
1	211 ⁴	Division	Sample
1	117 ¹	Addition	Possible
1	187 ⁴	Multiplication	Purely artificial
1	233 ⁶	Multiplication	Possible
1	212 ²	Division	Possible
1	29 ⁶	Subtraction	Possible
1	215 ¹	Division	Sample
2	23 ⁵ 63 ⁴	Subtraction	Possible

Situation

Lunches, Will has to carry

Magazines, number sold

Marbles, cost of

number lost

number possible to buy with given amount of money

Measures, changing yards to feet

chart showing number of quarts in a gallon

completing statements on pints, quarts, and gallons

division of foot rule

division of yard rule

estimating foot lengths

estimating inch lengths

estimating yard lengths

filling gallons with quarts

filling quarts with pints

finding what different containers hold

number of pints in a given number of gallons

number of pints in a given number of quarts

number of quarts in peck

number of quarts in a given number of gallons

Measuring, classmates

lines and objects

Miles, a car is driven each day

driven in a new car

driven on trip

Frequency	Page and Example	Process	Classification
1	233 ¹	Multiplication	Sample
1	228 ⁶	Addition	Possible
1	171 ²	Multiplication	Possible
1	23 ²	Subtraction	Possible
2	208 ² 210 ⁶	Division	Possible
2	182 ³ 188 ⁷	Multiplication	Fact question
1	189 ¹	Reading	Mere exercise
4	33 ^{3,4} 34 ³ 168 ²	None	Fact question
4	14 ^{1,2,3,4}	Measuring	Mere exercise
3	15 ^{4,5,6}	Measuring	Mere exercise
3	13 ^{2,4,5}	Measuring	Mere exercise
2	15 ^{2,3}	Measuring	Mere exercise
2	13 ^{1,3}	Measuring	Mere exercise
1	33 ²	None	Possible
1	33 ¹	None	Possible
2	34 ^{1,2}	Measuring	Mere exercise
1	171 ⁷	Multiplication	Fact question
1	171 ⁸	Multiplication	Fact question
1	192 ²	Multiplication	Fact question
1	189 ²	Multiplication	Fact question
2	16 ^{1,2}	Measuring	Real situation
3	14 ⁵ 15 ¹ 16 ³	Measuring	Mere exercise
1	218 ⁶	Division	Purely artificial
1	199 ¹	Multiplication	Sample
1	187 ³	Multiplication	Purely artificial

Situation

files, taken to visit relatives

driven to Yellowstone Park

John lives from two boys

number driven

number billed

number walked

milk, cost of

number of bottles delivered

number of bottles the milkman can carry

number of cents possible to buy with given amount of money

number of quarts bought

number of quarts sold to the store

money, adding coins

amount earned by brother

amount earned by uncle

amount earned in a given length of time

amount raised on sale

amount needed to purchase articles desired

checking on change

counting nickles

difference in the cost of articles

difference in the original price and the sale price

Pre- quency	Page and Example	Process	Classification
3	148 ¹ 149 ⁻ 176 ²	Subtraction Multiplication and addition	Purely artificial Sample
1	94 ¹	Addition	Sample
1	147 ⁵	Subtraction	Purely artificial
1	12 ³	Division	Purely artificial
1	216 ⁰	Division	Purely artificial
1	123 ⁶	Multiplication	Possible
1	190 ⁷	Multiplication	Possible
2	107 ^{1,2}	Multiplication	Sample
1	225 ⁵	Division	Purely artificial
1	219 ⁴	Division	Possible
1	192 ⁷	Multiplication	Possible
1	196 ¹	Multiplication and addition	Sample
4	114 ^{1,5} 115 ^{3,4}	Addition	Sample
2	196 ² 228 ⁻	Multiplication Multiplication	Sample Purely artificial
1	220 ⁵	Division	Purely artificial
1	216 ⁵	Division	Possible
1	98 ¹	Subtraction	Possible
2	80 ¹ 165 ⁷	Subtraction	Possible
3	105 ^{1,2} 107 ²	Addition Addition	Sample Possible
1	2 ³	Counting by five	Purely artificial
1	98 ²	Subtraction	Possible
1	98 ⁴	Subtraction	Possible

Situation

Money, making problems on

names of coins

needed to buy a baseball bat

coins received from sale of stamps in school post office and value of same

number of nickles in a given amount of money

number of pennies each boy has

number of pennies given to children

number of quarters in a given amount of money

raising money for school funds

saved as a messenger boy

spent for a pencil

spent for candy

spent for Christmas presents

total amount the children had

value of coins

ways of reading and writing

Office, number of days worked in

Onions, bunches sent to the market

Oranges, bought at the store

cost of

number bought

Fre- quency	Page and Example	Process	Classification
4	50 ^{3,4,5,6}	Subtraction	Possible
2	102 ^{1,4}	None	Fact question
1	102 ⁸	Subtraction	Possible
7	37 ^{8,9,10,11,12} 37 ^{13,14}	Counting	Possible
2	225 ^{3,4}	Division	Possible
1	30 ⁵	Subtraction	Possible
3	220 ¹ 186 ⁶ 224 ²	Multiplication Division	Possible Possible
2	190 ⁶ 220 ⁷	Multiplication Division	Purely artificial Purely artificial
2	150 ^{1,2}	Subtraction	Possible
1	222 ¹	Division	Purely artificial
1	80 ¹	Subtraction	Possible
1	23 ¹	Subtraction	Possible
1	151 ³	Subtraction	Possible
5	80 ^{2,3} 98 ³ 116 ³ 151 ⁴	Addition	Possible
20	48 ^{1,2,3,4,5,6,7} 48 ^{8,9,10} 49 ¹ 102 ^{2,5,6,7} 103 ^{1,2} 113 ¹ 157 ⁶ 159 ⁷	None Multiplication	Fact question Fact question
5	102 ³ 103 ^{3,4,5,6}	None	Were exercise
1	162 ¹²	Multiplication	Purely artificial
1	79 ⁴	Subtraction	Purely artificial
1	99 ²	Addition	Possible
3	157 ³ 156 ¹ 159 ²	Addition Multiplication	Purely artificial Possible
1	220 ²	Division	Possible

Situation

Oranges, number brought home from the store

number mother has

Taints, cost of

Paper, amount of money earned selling

cost of

divided into equal parts

drawing paper needed for class

hours spent selling

selling old ones

March, pupils marching in

Party, number of friends asked to

leaches, number in basket

Tears, number Julia had

People, number at tables in the restaurant

Pianos, a dealer bought

Picnic, children at

Picture cards, number bought

Pictures, ones had in the art show

ictures and poster in the art show

lms, number Peter brought

ponies, amount received on ponies sold

ponies, cost of

Fre- quency	Page and Example	Process	Classification
1	51 ¹	Subtraction and addition	Sample
1	225 ⁶	Division	Possible
1	178 ¹	Multiplication and addition	Sample
1	116 ¹	Addition	Sample
2	171 ^{3,4}	Multiplication	Purely artificial
1	217 ¹	Division	Sample
2	29 ⁴ 175 ⁵	Subtraction Multiplication	Possible Possible
1	190 ³	Multiplication	Purely artificial
7	145 ^{2,3,4,5,6,7} 144 ¹	Subtraction Subtraction	Sample Possible
1	228 ⁵	Multiplication	Possible
1	29 ⁵	Subtraction	Possible
1	234 ⁴	Multiplication	Purely artificial
1	69 ³	Addition	Possible
1	192 ¹	Multiplication	Purely artificial
1	197 ¹	Multiplication and addition	Sample
3	79 ³ 214 ¹ 228 ⁷	Subtraction Division	Possible Sample
1	208 ⁴	Division	Possible
1	116 ¹	Addition	Sample
1	118 ²	Addition	Possible
1	69 ⁵	Addition	Possible
1	175 ¹	Multiplication	Purely artificial
1	159 ⁵	Multiplication	Possible

Situation

Pupils, divided into groups in the playground

larger number in the two schools

number in grades two and three

number in groups in the room

number present for a week

Rabbits, amount of money paid for

number of white and gray

the boys sold

seen on the way to school

Radishes, bunches taken to the market

Record cards for school

Records of supplies bought for the new pupils

Ribbon, divided among girls

Roller skates, number of pairs needed

Roman numerals, writing table of

Roses, in the garden

Sandwiches, number the children had

School cafeteria, problems on

School fair, buying things at

School garden, amount of money made on selling things grown in

School lunchroom, number of pupils seated in

Frequency	Page and Example	Process	Classification
1	216 ⁶	Division	Possible
1	202 ¹⁰	Subtraction	Possible
1	117 ³	Addition	Possible
3	5 ^{1,2,5}	Counting	Mere exercise
1	228 ³	Subtraction	Possible
1	175 ⁷	Multiplication	Possible
1	63 ⁵	Addition	Purely artificial
2	78 ^{1,2}	Subtraction	Sample
1	8 ³	Addition	Purely artificial
1	79 ⁵	Subtraction	Purely artificial
8	122 ^{1,2} 123 ^{1,2,3,4,5,6}	Reading	Mere exercise
1	169 ¹	Multiplication	Possible
1	224 ¹	Division	Purely artificial
1	29 ¹	Subtraction	Possible
5	100 ³ 101 ^{1,2,3} 100 ²	None Writing numbers	Mere exercise Mere exercise
1	202 ⁴	Addition	Purely artificial
2	212 ⁴ 67 ³	Division Addition	Possible Sample
6	82 ¹ 82 ^{2,3,4,5,6}	Addition Subtraction	Possible Possible
7	136 ¹ 137 ^{3,4,5,6,7}	Subtraction Subtraction	Sample Possible
9	58 ¹ 58 ² 59 ^{3,4,5,6,7,8,9}	Subtraction Subtraction	Sample Possible
2	173 ¹ 190 ⁴	Multiplication and addition Multiplication	Sample Possible

Situation

Schoolroom, find groups of things in
 flowers on reading table in
 number of drawers in the cabinet in the front of the
 number of pictures on the wall

School supplies, difference in number taken from supply store
 number needed
 number possible to buy with a given amount
 taken out of the supply store

Boats, going camping

Seashore, number of days spent at
 seats, for pupils in the fourth grade
 for pupils in the third grade

Shoes, cost of

States, number sold

Stamp book, number of stamps in
 stamps placed in
 starter

Stamps, cost of

number collected

number given away

number in school post office and cost of same

number possible to buy with a given amount of money

number three boys had

Frequency	Page and Example	Process	Classification
1	5 ⁷	Counting	Mere exercise
1	6 ³	Addition	Possible
1	6 ¹	Addition	Sample
1	6 ²	Addition	Possible
1	26 ⁴	Subtraction	Possible
1	184 ¹	Addition	Possible
1	210 ¹	Division	Possible
5	25 ^{1,2} 26 ^{1,2,3}	Subtraction	Sample
2	96 ¹ 97 ²	Subtraction	Sample
1	175 ⁶	Multiplication	Purely artificial
1	202 ²	Multiplication	Possible
1	202 ¹	Subtraction	Possible
1	180 ⁵	Multiplication	Purely artificial
1	208 ⁷	Division	Purely artificial
1	194 ¹	Multiplication	Possible
1	120 ²	Addition	Possible
1	117 ²	Addition	Possible
2	171 ⁶ 202 ⁹	Multiplication	Purely artificial
1	151 ²	Addition	Possible
1	151 ¹	Subtraction	Possible
7	36 ^{1,2,3,4} 37 ^{5,6} 37 ⁷	Counting	Possible
4	208 ⁵ 209 ¹ 216 ² 225 ²	Division	Purely artificial
1	217 ²	Division	Sample

Situation

Store, helping father in

Stories, number read in a week

String, dividing a string in half

Tablets, cost of

Telephone, reading telephone numbers

Tickets, for merry-go-round

for show

selling them for the game

Time, at end of trip

reading the time

taken to reach home

Tomatoes, number that can be bought with a given amount of money

Tons, number that can be bought with a given amount of money

shared equally with friend

Toy cars given away

Toy trains received

Toys, amount paid for toys bought

in the Christ as show window

number that can be bought with a given amount of money

Bicycles, number of wheels on

number sold

pair that John and his uncle took

Frequency	Page and Example	Process	Classification
1	120 ⁴	Writing numbers	Mere exercise
1	183 ³	Multiplication	Possible
1	211 ²	None	Mere exercise
3	159 ⁵ 231 ⁷	Multiplication	Possible
1	123 ⁷	Reading	Mere exercise
1	225 ¹	Division	Possible
8	159 ⁴ 186 ³ 283 ^{1,4}	160 ^{1,4,5} 187 ¹ Division	Possible Possible
1	116 ²	Addition	Sample
1	63 ⁶	Addition	Purely artificial
11	72 ^{1,2,3} 73 ¹	73 ^{4,5,6} 74 ^{1,6,7,4} None	Mere exercise
1	147 ⁴	Subtraction	Possible
1	219 ¹	Division	Possible
1	210 ⁴	Division	Possible
1	39 ¹	Counting	Purely artificial
1	19 ⁴	Subtraction	Purely artificial
1	43 ¹	Addition	Sample
8	83 ^{1,2,4} 106 ^{2,3} 106 ¹ 83 ^{2,5}	Addition Addition Subtraction	Possible Sample Possible
6	89 ^{1,4,6} 89 ^{6,5,5}	Subtraction Addition	Possible Possible
1	206 ¹	Division	Possible
1	202 ⁶	Multiplication	Purely artificial
1	202 ⁵	Multiplication	Purely artificial
1	125 ¹³	Reading numbers	Mere exercise

Situation

Valentines, amount spent for

received at school and in the mail

Visiting day in the school

Wagons, wheels needed for

weight, amount two boys weigh

finding the difference in the weight of two children

finding whether the children are over or under weight

Windows, number of groups in the room

number of window panes in

number opened and closed

words, learned for spelling

Fre- quency	Page and Example	Process	Classification
1	146 ⁵ ,	Addition	Possible
4	146 ^{1,3,4} 146 ²	Subtraction Addition	Possible Possible
6	86 ^{1,2} 87 ³ 87 ^{5,6} 87 ⁴	Addition Addition None	Sample Possible Mere exercise
1	190 ²	Multiplication	Possible
1	175 ³	Multiplication	Purely artificial
1	79 ²	Subtraction	Possible
9	140 ¹ 141 ² 141 ^{3,4,5,6,7,8} 143 ¹	Addition and subtraction Addition and subtraction	Sample Possible
1	5 ⁴	Addition	Mere exercise
1	5 ⁶	Counting	Mere exercise
1	5 ⁵	Addition	Mere exercise
1	216 ⁷	Division	Possible

Table I

Showing The Frequency In Book 3
Of Types Of Problems As Explained On Page 13

Type of Problem	Frequency
Sample	74
Fact Question	41
Mere Exercise	94
Purely Artificial	81
Possible (Improbable)	282
Real Situation	<u>6</u>
<u>Total number of problems</u>	578

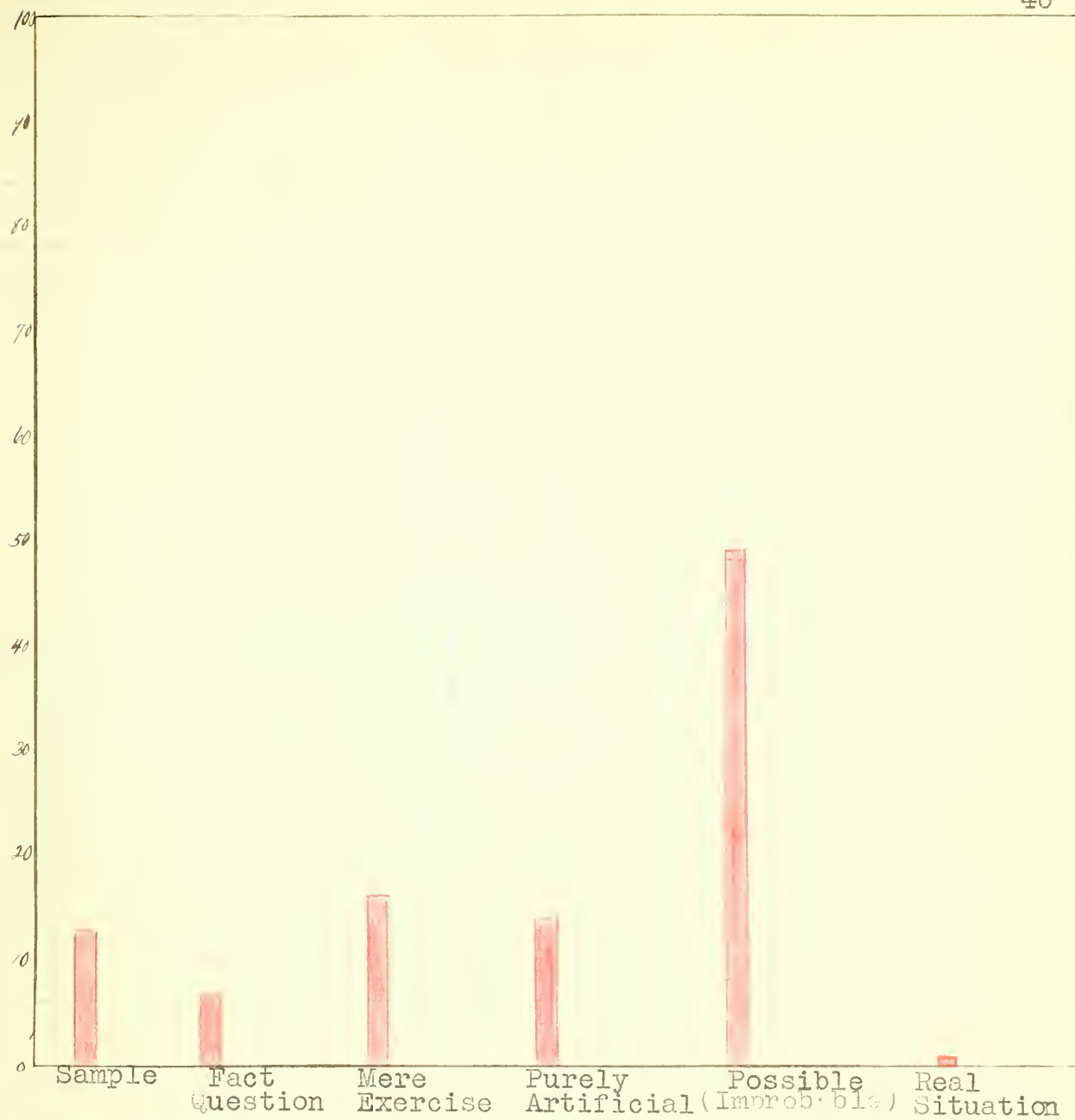


Fig. 1

Graphic Interpretation
of the Frequency of Types of Problems
in Book 3 as Shown in Table I

DETAILED ANALYSIS

of the

PROBLEMS in BOOK IV

CHILD LIFE ARITHMETIC SERIES

Situation

Acres, divided into equal farms

Airplane, number of miles flown on trip

total weight carried in

Apartments, total number in block

Apples, amount boys picked

number of bushels sold

number possible to buy with a given amount of money

number used in making a pie

Apple trees, number set out in equal rows

Automobiles, total number in block

Balloons, number possible to buy with a given amount of money

Bakery, number of buns sold in

Bank, difference in amount boys and girls deposited

total amount in at the end of the month

withdrawing money from

Baseball, cost of outfit

drawing a plan of a diamond to scale

making a diamond

number of boys on the team

Basketball, cost of outfits bought by the Mother's Club

Baskets of food, cost of

Bicycles, number store sold

Fre- quency	Page and Example	Process	Classification
2	107 ¹ 159 ³	Division	Purely artificial
2	156 ¹ 156 ³	Multiplication Addition	Purely artificial Purely artificial
1	156 ²	Addition	Purely artificial
1	158 ¹	Multiplication	Purely artificial
1	71 ³	Multiplication	Purely artificial
1	79 ²	Multiplication	Purely artificial
1	122 ⁷	Division	Possible
1	224 ¹	Division	Possible
1	129 ¹	Division	Sample
1	158 ²	Division	Purely artificial
1	99 ¹	Division	Possible
1	131 ¹	Division and Multiplication	Sample
1	26 ⁶	Subtraction	Possible
1	7 ³	Addition	Purely artificial
1	207 ⁴	Division and Subtraction	Purely artificial
1	116 ⁷	Addition	Possible
3	182 ^{2,3,4}	Measuring	Mere exercise
1	182 ¹	Measuring	Possible
1	213 ³	Division	Possible
8	84 ^{1,3} 85 ^{4,7} 84 ² 85 ^{5,6} 85 ⁸	Addition Multiplication Subtraction	Possible Possible Possible
1	188 ¹	Multiplication	Sample
1	89 ¹	Multiplication	Purely artificial

Situation

Bicycles, taking a ride on

Blackberries, number of quarts boys picked

Boat, bought by the boys

Balance needed for final payment on

Boat, lumber, stock sold in

Books, cost of

cost of readers for class

making piles of

Book store, cost of articles purchased at

Bread, number of loaves possible to buy with a given amount

Boxes, average number made at factory in one day

Bugs, number of miles driven across the country

number of times possible to ride on with a given amount

Butter, amount needed in recipe

Caddy at golf links

Calendar, explanation of leap year

finding days on

naming the months on

number of days in a given number of months

number of weeks in a year

Frequency	Page and Example	Process	Classification
2	106 ⁶ 116 ⁵	Division	Possible
1	103 ⁵	Division	Possible
1	163 ¹	Division, addition, and subtraction	Purely artificial
1	163 ⁵	Subtraction	Purely artificial
3	163 ²	Division and subtraction	Purely artificial
	163 ³	Addition and multiplication	Purely artificial
	163 ⁴	Addition	Purely artificial
1	6 ³	Addition	Purely artificial
1	157 ⁴	Multiplication	Possible
1	101 ¹	Division	Possible
1	184 ⁵	Addition and subtraction	Possible
1	102 ¹	Division	Possible
1	146 ¹	Division	Sample
1	82 ¹	Multiplication	Sample
1	134 ¹	Division and multiplication	Possible
1	226 ⁴	Subtraction of fractions	Possible
1	221 ¹	Division and multiplication	Purely artificial
1	43 ³	None	Fact question
2	43 ^{5,7}	None	Here exercise
2	43 ^{1,2}	None	Fact question
4	43 ^{4,5,6,7}	Addition	Possible
1	138 ²	Division	Sample

Situation

Calves, number bought

Candy bars, cost of

number given away

number shared ecually

Cattle seen on ranches

Chains, paper ones made for room decoration

Chart, finding products on for multiplication

made for cost of gasoline

made for cost per quart of canning fruit

Cherries, number of quarts picked

number of quarts sold

Chicken business, find gain or loss of

sharing gain from

total amount received from and money banked

Chickens, amount paid for care of

amount received from sale of

amount received from sale of, plus sale of eggs

amount received from sale of, plus sale of equiprment

cost of

Fre- quency	Page and Example	Process	Classification
1	106 ²	Division	Purely artificial
1	224 ⁶	Division	Possible
1	226 ³	Subtraction of fractions	Possible
1	222 ²	Division	Sample
1	127 ¹	Addition	Purely artificial
1	81 ²	Multiplication	Possible
1	58 ¹	Reading	Mere exercise
3	64 ² 64 ³ 65 ⁵	Multiplication Reading Addition and multiplication	Purely artificial Mere exercise Purely artificial
3	143 ² 143 ^{3,4}	Division Reading	Possible Mere exercise
1	113 ²	Division	Sample
2	130 ¹ 158 ³	Division Division	Sample Purely artificial
1	175 ⁴	Addition and subtraction	Possible
1	176 ²	Subtraction and division	Possible
1	176 ³	Addition and subtraction	Possible
1	176 ¹	Multiplication	Possible
1	174 ¹	Multiplication	Possible
1	175 ²	Addition	Possible
1	175 ³	Addition	Possible
5	172 ² 177 ³ 172 ³ 177 ^{1,2}	Multiplication and addition Multiplication Multiplication	Possible Possible Purely artificial

Situation

Chickens, cost of equipment for

cost of scratch feed for

number bought

record of equipment bought and cost of same

record of sales of

total cost of, plus equipment

Children, difference in number in two schools

number in rows in school-room

transporting them to the basketball meet

Christmas savings club, money given to charity from

money received from

Christmas trees, amount received from sale of

Circus, school held to raise money

City blocks, length of

Clothing, amount the store received from sale of coats

bought at sale

cost of

cost of articles listed

cost of coat

cost of shirts

cost of suit

difference in cost of articles

Frequency	Page and Example	Process	Classification
3	173 ^{1,2} 177 ⁵	Multiplication	Possible
1	177 ⁴	Multiplication	Possible
1	172 ¹	Addition	Purely artificial
2	173 ³ 173 ⁴	None Multiplication and addition	Mere exercise Possible
1	174 ²	Multiplication and addition	Possible
1	175 ¹	Addition	Possible
1	28 ⁵	Subtraction	Possible
3	103 ^{2,3} 120 ⁵	Division	Possible
1	144 ¹	Division and multiplication	Sample
1	81 ⁴	Subtraction	Purely artificial
1	81 ³	Addition	Purely artificial
1	81 ¹	Multiplication	Purely artificial
1	178 ⁴	Addition	Possible
1	107 ³	Multiplication	Fact question
1	86 ¹	Multiplication	Purely artificial
1	123 ⁴	Addition	Possible
2	29 ^{1,2}	Addition	Purely artificial
1	209 ²	Addition and subtraction	Possible
1	161 ³	Division and subtraction	Purely artificial
1	154 ¹	Division	Purely artificial
1	28 ⁴	Subtraction	Purely artificial
1	209 ¹	Subtraction	Possible

Situation

Clothing, difference in original and sales price

finding totals on record sheet for sale of coats

making problems on buying at coat sale

record sheet prepared for sale of coats

Coast guard, difference in number of lives saved by

number of lives saved by

Colts, sold by ranch

Cookies, girls made for the fair

number left

Corn, difference in number of bushels two boys have

number of cans possible to buy with a given amount

number of hills of in field

Cost of items listed

Dairy farm, number of men needed to do milking on

Dandelions, average number dug

Distance, between two towns

from street to garage

Dolls, material needed for dresses

Eggs, amount received from sale of

dozens sold

making problems on

number collected in one week

Frequency	Page and Example	Process	Classification
6	69 ⁵ 88 ^{4,5,6,8} 123 ³	Subtraction	Purely artificial
6	87 ^{3,4,5} 88 ^{1,2,3}	Multiplication Addition	Purely artificial Purely artificial
1	88 ⁷	None	Possible
1	87 ²	Copying	Purely artificial
1	22 ⁴	Subtraction	Possible
1	22 ³	Addition	Possible
1	189 ²	Multiplication	Purely artificial
1	160 ²	Addition and multiplication	Possible
1	26 ³	Subtraction	Possible
1	155 ¹	Subtraction	Purely artificial
1	133 ¹	Division and multiplication	Sample
1	189 ¹	Multiplication	Sample
1	169 ²	Multiplication and division	Purely artificial
1	108 ¹	Division	Possible
1	141 ⁵	Division	Possible
1	221 ²	Division and multiplication	Purely artificial
1	110 ¹	Division	Sample
1	226 ⁶	Subtraction of fractions	Possible
1	174 ³	Multiplication	Possible
2	158 ⁴ 79 ¹	Multiplication Multiplication	Purely artificial Fact question
1	174 ⁵	None	Possible
1	28 ³	Addition	Purely artificial

Situation

Eggs, total dozens sold and amount received from

Fair, helping the gateman at

Farm, cost of

Fire, value of property lost by

Flower bed, drawing plan of to scale

Flowers, bunches of pansies sold

Fruit, cost of canning per quart

Games and toys, cost of

Gasoline, finding price of a given number of gallons

making problems on

Grapefruit, cost of

number bought

number possible to buy with a given amount

Gymnasium, time spent in

Height, difference in that of two boys

Hens, number bought (two varieties)

Hike, counting animals seen on

finding average distance traveled per hour on

number of hours walked on

time junior hikers returned from

Logs, number sold

Hotel, average of bills paid at

Change received on payment of bill

Frequency	Page and Example	Process	Classification
1	174 ⁴	Addition	Possible
1	6 ⁴	Addition	Purely artificial
1	185 ¹	Multiplication	Sample
1	184 ¹	Subtraction	Purely artificial
3	181 ^{1,2,3}	Measuring	Mere exercise
1	157 ³	Multiplication	Possible
2	142 ¹	Division and multiplication	Sample
	143 ¹	Division	Possible
1	123 ¹	Addition	Possible
1	64 ¹	Multiplication	Purely artificial
1	65 ⁴	None	Possible
1	224 ³	Division	Possible
1	218 ²	None	Fact question
1	104 ¹	Division	Possible
1	218 ⁵	Division	Sample
1	26 ⁴	Subtraction	Possible
1	111 ¹	Division	Purely artificial
1	165 ⁴	Multiplication and subtraction	Possible
1	165 ³	Division	Possible
1	165 ²	Division	Possible
1	165 ¹	Reckoning time	Fact question
2	106 ^{3,4}	Division	Purely artificial
1	198 ⁴	Addition and division	Purely artificial
1	198 ²	Multiplication, addition and subtraction	Purely artificial

Situation

Hotel, expenses at

Ice cream, bought for picnic

Kerosene, cost of

Kite, length of string on

Lace, bought for trimrings

cost of

Lambs, sold

Lemonade, sold by boys

Lemons bought by boys

License plates, reading numbers on

Lot, sold

Magazines, average number sold

number of pages read in

number sold

Measures, division of foot rule

expressing fractional parts of yards in feet

filling blanks

Fre- quency	Page and Example	Process	Classification
2	198 ¹	Division and addition	Purely artificial
	198 ³	Addition and multiplication	Purely artificial
1	71 ²	Multiplication	Possible
1	177 ⁶	Multiplication	Purely artificial
1	122 ¹	Division	Possible
2	226 ^{1,2}	Addition of fractions	Purely artificial
1	161 ⁴	Division and subtraction	Purely artificial
1	207 ¹	Multiplication and subtraction	Purely artificial
1	2 ²	Addition	Sample
1	2 ³	Addition	Possible
2	11 ^{4,5}	None	Mere exercise
1	154 ⁵	Division	Purely artificial
2	141 ²	Addition and division	Possible
	159 ⁴	Division	Possible
1	22 ¹	Addition	Possible
9	55 ² 155 ² 203 ²	Multiplication	Possible
	157 ²	Multiplication	Sample
	162 ^{1,5,6}	Multiplication and subtraction	Possible
	162 ^{2,3}	Multiplication and addition	Purely artificial
4	111 ⁴ 214 ^{1,2,5}	Measuring	Mere exercise
3	212 ^{1,2,3}	None	Fact question
6	119 ¹	Multiplication and division	Fact question
	66 ² 68 ¹ 217 ^{1,3}	Multiplication	Fact question
	108 ⁴	Division	Fact question

Situation

Measures, number of gallons in given quarts

number of pints in given gallons

value of fractional parts of a yard

writing tables of liquid measure

Measuring, lines and objects

Meats, cost of steak

Melons, number possible to buy with a given amount of money

Miles, average number driven in an hour

difference in number two cars had traveled

number pilot flies between two cities

total number driven on business trip

two boys live from each other

two cities are from New York

Milk, number of bottles milkman delivers

number of quarts sold

Money, amount earned

amount given to children

amount left after purchasing articles

amount left after purchasing a sweater

amount needed to buy articles desired

amount of change to be received

Fre- quency	Page and Example	Process	Classification
1	208 ¹⁵	Division	Fact question
1	208 ¹⁶	Multiplication	Fact question
1	228 ⁴	None	Mere exercise
1	2 ¹	None	Fact question
2	214 ⁶ 215 ⁴	Measuring	Mere exercise
1	161 ¹	Multiplication and subtraction	Possible
1	104 ⁴	Division	Possible
2	141 ³	Addition and division	Purely artificial
	203 ⁴	Division and subtraction	Purely artificial
1	18 ⁴	Subtraction	Possible
1	107 ⁵	Multiplication	Purely artificial
1	156 ⁵	Multiplication	Purely artificial
1	7 ¹	Addition	Purely artificial
1	156 ⁶	Subtraction	Purely artificial
2	108 ^{2,3}	Division	Fact question
1	161 ²	Multiplication	Purely artificial
5	89 ³ 69 ³ 184 ^{2,3} 162 ⁴	Addition Multiplication Addition and subtraction	Purely artificial Purely artificial Purely artificial
1	122 ⁵	Multiplication	Purely artificial
1	207 ³	Addition and subtraction	Possible
1	34 ⁵	Subtraction	Possible
4	26 ² 34 ¹ 116 ³ 120 ⁴	Subtraction	Possible
3	160 ¹	Addition and subtraction	Sample
	167 ⁵ 195 ⁴	Subtraction	Possible

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Situation

Money, amount raised for beautifying the school grounds

amount withdrawn from bank to buy school books

average amount saved per week

balance shared equally

counting and totalling playground money

difference in amount spent and amount originally had

difference in amount two children have

divided equally among children

divided equally into prizes

expressing cents in fractions of a dime

expressing fractions of a dollar in dimes

making change

number of pennies lost

number of pennies saved

saved to buy a bicycle

spent for miscellaneous items listed

total amount had

total amount needed for expenses on trip

value of coins

Fre- quency	Page and Example	Process	Classification
3	178 ¹ 178 ² 179 ¹	Multiplication Multiplication and addition Addition	Possible Possible Possible
1	112 ⁴	Division	Purely artificial
1	171 ⁴	Addition and division	Possible
1	207 ²	Addition, subtraction and division	Possible
5	60 ^{2,3} 61 ^{4,5,6}	Counting and adding	Possible
1	127 ⁴	Subtraction	Possible
1	69 ²	Subtraction	Possible
1	154 ⁶	Division	Purely artificial
1	113 ¹	Division	Sample
1	216 ⁵	None	Mere exercise
2	216 ^{6,7}	Division and multiplication	Purely artificial
1	119 ²	Addition	Possible
1	112 ⁶	Division	Possible
1	138 ¹	Division	Sample
1	116 ⁴	Division	Possible
1	34 ²	Addition	Possible
1	6 ²	Addition	Purely artificial
1	34 ⁴	Addition	Possible
9	112 ¹⁰ 131 ² 195 ^{1,2,3} 213 ⁴ 135 ¹ 218 ⁶ 228 ³	Division Division Division and multiplication None	Possible Sample Purely artificial Mere exercise

Situation

Nuts, cost of pecans

number of pounds of hickory nuts sold

number of quarts of walnuts picked

peanuts sold at the school football game

Oranges, cost of

Paper, divided equally among children

used in making kite

Paper dolls, made for party

Papers, number sold in a given length of time

Paper sale, school held to raise money

Party, cost of favors for

Peach trees, number set out in each row

number of stakes driven around

Picnic, number coming on bus

Pigeons (homing), two girls started

difference in speed of two

Playing school, problems on

Ponies, cost of

Population, difference in that of two cities

of cities

of state

of United States

Potatoes, put in bags by storekeeper

Fre- quency	Page and Example	Process	Classification
1	224 ⁴	Division	Possible
1	79 ³	Multiplication	Sample
1	106 ¹	Division	Fact question
1	154 ⁴	Division	Possible
2	120 ² 224 ⁵	Multiplication Division	Possible Possible
1	222 ¹	Division	Sample
1	226 ⁵	Subtraction of fractions	Purely artificial
1	26 ¹	Subtraction	Possible
2	55 ¹ 157 ¹	Multiplication	Sample
1	178 ³	Multiplication	Possible
1	103 ¹	Division	Possible
1	103 ⁷	Division	Possible
1	110 ³	Division	Possible
1	213 ⁵	Division	Purely artificial
1	159 ¹	Division	Purely artificial
1	159 ²	Subtraction	Purely artificial
3	23 ¹ 23 ^{2,3}	Subtraction Subtraction	Sample Possible
1	189 ³	Multiplication	Purely artificial
2	22 ² 158 ⁵	Subtraction	Possible
6	10 ^{1,2} 11 ³ 170 ^{1,4,5}	Reading numbers	Mere exercise
1	170 ⁷	Reading and writing numbers	Mere exercise
1	170 ⁸	Reading and writing numbers	Mere exercise
1	122 ⁶	Multiplication	Fact question

Situation

Present, choosing coins for payment of and change received

Problems, making one using a given combination

Programs, passed out at the school show

Pupils, divided into groups for game

Puppies, boy wants to sell

Quilt, number of pieces given away

number of pieces needed for

number of pieces sewed on

Reading, keeping record of for library

Recipe, doubling

Restaurant, number of tables in

Ribbon, number of inches cut off

number of inches used

used in wrapping packages

Roller skates, difference in original and sales price

Roman numerals, reading

writing

Roses, number of bunches the store had to sell

Sale, finding price of articles for

number of people attending

Sales slips, making out

reading

School ball game, selling tickets at

Frequency	Page and Example	Process	Classification
6	196 ^{1,2,3,4,5,6}	Addition and subtraction	Purely artificial
1	127 ⁵	None	Possible
1	154 ³	Division	Possible
1	99 ²	Division	Sample
1	71 ¹	Multiplication	Possible
1	122 ³	Division	Possible
1	28 ²	Subtraction	Possible
1	111 ²	Division	Possible
1	140 ²	Addition and division	Possible
2	227 ^{4,5}	Multiplication of mixed numbers	Possible
1	150 ²	Division	Purely artificial
1	112 ³	Division	Possible
2	218 ³ 218 ⁴	Division Division	Fact question Sample
1	224 ²	Division	Purely artificial
1	28 ¹	Subtraction	Possible
3	16 ^{1,2,3}	None	Mere exercise
6	15 ^{1,2,3,4,5} 16 ⁴	None	Mere exercise
1	103 ⁴	Division	Purely artificial
2	220 ^{1,2}	Division and multiplication	Purely artificial
1	123 ⁵	Addition	Possible
2	168 ² 192 ¹	Addition	Possible
6	167 ^{1,2,3,4} 168 ¹ 169 ¹	None	Mere exercise
1	107 ²	Division	Possible

Situation

School day, length of

School fair, making change at

pupils acting as cashier at

report made by cashiers at

School grounds, bulbs bought for

keeping record of bulbs bought for

plants bought for

shrubs bought for

School play, amount paid on

cost of rental of costumes for

number of people in audience

School picnic, bus fare for pupils going on

School, record of perfect attendance at

School supplies, cost of

Sheep, cost of

Ship, number of passengers on

Soup, number of cans possible to buy with a given amount

Spelling, average grade for

number of pupils making perfect record in

Stadium, solve problems on

Fre- quency	Page and Example	Process	Classificati n
1	161 ⁵	Addition and subtraction	Possible
1	75 ²	Making change	Purely artificial
8	37 ^{1,2,3,4} 36 ^{1,2,3,4} 35 ^{1,2,3,4}	Counting and making change	Possible
1	75 ¹	Addition and multiplication	Possible
1	180 ²	Multiplication and addition	Possible
1	180 ¹	Multiplication	Possible
2	180 ⁴ 180 ²	Multiplication Division and addition	Possible Possible
2	173 ^{2,3,4,5}	Multiplication	Possible
1	131 ³	Multiplication and subtraction	Possible
1	134 ¹	Addition and multiplication	Possible
1	194 ²	Addition and subtraction	Possible
1	252 ³	Multiplication	Possible
1	150 ⁴	Division	Possible
1	123 ⁸	Addition	Possible
1	132 ⁶	Division	Purely artificial
1	39 ¹	Multiplication	Purely artificial
2	105 ^{1,4}	Division	Possible
1	141 ¹	Addition and division	Possible
1	721 ³	Division and multiplication	Possible
1	30 ⁵	None	Possible

situation

Stadium, number of seats left

total number it will seat

Stamp book, number of stamps in

Stamps, cost of

divided equally among four boys

number needed to mail letters

number sold

number possible to buy with a given amount of money

Store, amount of change received at

amount of money received from sale of overcoats at
checking after a sale

cost of articles bought at

difference in cost of articles bought at

strawberries, number of rows each boy should pick

strawberry plants, set out

string, dividing into equal parts

sugar, cost of

structure, number of rods of a yard by boys

temperature, finding difference in

thermometer, drawing and marking degrees on

Fre- quency	Page and Example	Process	Classification
1	20 ³	Subtraction	Possible
3	20 ^{1,2,4}	Addition	Possible
2	77 ¹ 78 ¹	Multiplication Multiplication and addition	Sample Sample
1	112 ⁴	Multiplication	Possible
1	154 ²	Division	Possible
1	26 ⁵	Subtraction	Possible
1	110 ²	Division	Possible
3	127 ³ 132 ¹ 136 ¹	Division Division Division and multiplication	Possible Sample Sample
1	102 ⁴	Subtraction	Possible
1	60 ⁴	Multiplication	Purely artificial
1	30 ¹	Multiplication and addition	Purely artificial
4	132 ⁵ 202 ³ 132 ⁵ 234 ⁷	Multiplication and addition Addition Division	Possible Possible Purely artificial
1	102 ³	Subtraction	Possible
1	222 ³	Division	Sample
1	127 ¹	Division	Sample
3	215 ^{1,2,3}	None	None exercise
1	203 ¹	Division and multiplication	Possible
1	213 ¹	Division and subtraction	Purely artificial
5	38 ^{1,2,3,4,5}	Subtraction	Possible
1	37 ¹	None	None exercise

Situation

Thermometer, learning to read
reading

Tickets, cost of for show

number class sold for school game

Time, length between given hours

number of minutes in a half hour

tasks usually performed at certain hours

train takes to run between two stations

ways of telling

ways of writing

Time table, reading

Time to plants, number in each row

Tractor, number of bushels sold

Trains, providing cost usually

Trains, difference in cost

Tris, difference in expenses of two families on

difference in miles two families travel on

expenses of

keeping record of expenses on

money spent on

number of hours traveled on

number of miles of payment traveled on

Frequency	Page and Example	Process	Classification
3	35 ^{1,2,3}	None	More exercise
3	36 ^{1,2,3}	None	More exercise
1	137 ²	Multiplication	Possible
1	140 ¹	Division	Sample
2	208 ^{17,18}	Reckoning time	More exercise
1	213 ²	Multiplication	Fact question
1	41 ¹	None	More exercise
1	41 ³	Subtraction	Possible
4	40 ^{2,3,4,6}	None	More exercise
2	40 ^{1,5}	None	More exercise
1	41 ²	Pending	More exercise
1	150 ³	Division	Purely artificial
1	145 ¹	Division	Sample
1	167 ⁶	Division	Possible
1	123 ²	Subtraction	Possible
1	18 ³	Subtraction	Possible
2	18 ^{2,5}	Subtraction	Possible
2	98 ^{2,3}	Multiplication	Possible
3	78 ^{1,2,3}	Addition and multiplication	Purely artificial
4	53 ^{7,8}	Addition	Possible
	53 ⁹	Addition and subtraction	Possible
	221 ⁴	Division	Possible
	40 ⁷	Telling time	More exercise
2	52 ³	Addition	Purely artificial
	52 ⁶	Subtraction	Purely artificial

Situation

Trip, number of miles traveled on

total expenses on

Tulips, counting number in garden

number florist has in each row

Turkey, number sold

Visitors, average number at school show of health posters

Weather report, reading and finding difference in temperature

Weather record, difference in temperature on for two days

keeping one

reading

Weight, average of boys on basketball team

average of boys on track team

average of players on baseball team

average of three girls

number rounds girls are overweight or underweight

total of boys

total of colts

total of football players

Wheat, bushels harvested from a given number of acres

Fre- quency	Page and Example	Process	Classification
10	17 ¹ 98 ¹ 18 ¹ 52 ¹ 52 ² , 4, 5 ⁵ 98 ⁵ 98 ⁴ 203 ⁵	Subtraction Multiplication Addition Subtraction	Sample Possible Possible Possible
1	76 ⁴	Addition	Possible
1	106 ⁵	Division	Possible
1	107 ⁴	Division	Purely artificial
1	218 ¹	Division	Purely artificial
1	150 ¹	Division	Possible
1	38 ⁶	Subtraction	Possible
1	37 ⁴	Subtraction	Possible
1	37 ⁶	None	Real situation
4	37 ^{2,3,5,7}	Reading	More exercise
1	141 ⁴	Division	Possible
1	140 ¹	Addition, division and multiplication	Sample
1	116 ⁶	Division	Possible
1	184 ⁴	Addition and division	Possible
2	120 ¹ 122 ²	Subtraction	Possible
2	7 ² 34 ³	Addition	Possible
1	120 ³	Addition	Purely artificial
1	156 ⁴	Multiplication	Possible
1	89 ²	Multiplication	Purely artificial

Table II

Showing The Frequency In Book 4
Of Types Of Problems As Explained On Page 13

Type of Problem	Frequency
Sample	39
Fact Question	25
Mere Exercise	72
Purely Artificial	125
Possible (Improbable)	236
Real Situation	<u>1</u>
<u>Total number of problems</u>	498

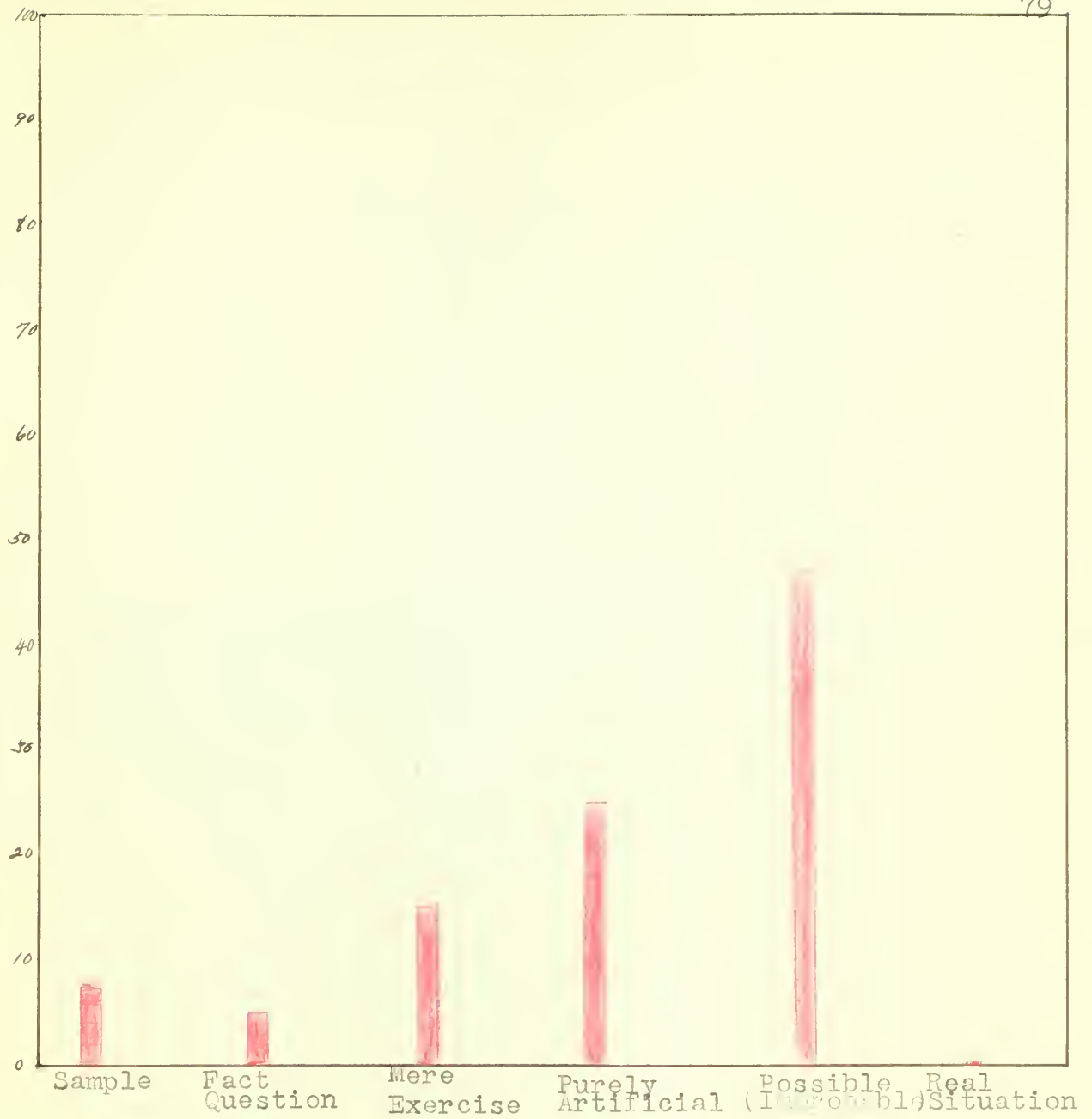


Fig. 2

Graphic Interpretation
of the Frequency of Types of Problems
in Book 4 as Shown in Table II

Detailed Analysis
of the
Problems in Book V
Child Life Arithmetic Series

Situation

Acres, in National Forest in Idaho

number of farm

Age, difference in between sisters

Airlines, average distance per hour

date of flight to Paris

number of passengers carried in

Animals, number in Glacier Park

Apples, difference in number of bushels children picked

divided equally

fractional part left

Apple orchard, number of trees sprayed per day

rows of trees in

Arithmetic problems, average correct each day

left to solve

number correct

number worked in a minute

Attendance, average for week

Automobile, balance to be paid on

counting number passing the house

Frequency	Page and Example	Process	Classification*
1	32 ⁷	Reading	More exercise
1	217 ⁵	Multiplication and division	Purely artificial
1	140 ⁷	Subtraction of mixed numbers	Possible
4	202 ^{4,5,6,7}	Division	Purely artificial
1	81 ⁷	Addition	Purely artificial
1	32 ¹⁴	Writing numbers	More exercise
1	33 ¹	Addition	Purely artificial
1	235 ⁵	Subtraction of mixed numbers	Purely artificial
1	165 ¹	Multiplication of fractions	Sample
1	118 ³	Subtraction of fractions	Purely artificial
1	70 ²	Division	Purely artificial
1	70 ¹	Division and multiplication	Sample
1	59 ³	Addition and division	Sample
1	107 ⁶	Addition and subtraction	Purely artificial
1	243 ⁷	Reading decimals	More exercise
1	193 ¹	Division of mixed numbers	Sample
1	110 ⁴	Addition and division	Possible
1	80 ⁴	Subtraction	Purely artificial
1	15 ¹	Subtraction	Sample

*see page 13

Situation

Automobile, gain on sale of

inches of tire casing on

number made in one year

record of speed

Bacon, average pounds used by restaurant per day

Bakery, cost of articles bought at

Balloons, clown gave away at circus

Bank, amount deposited in

amount left in

amount withdrawn from

Baseball, hours played

Beans, rows planted

Bedroom, square feet in

Bird house, cutting board for

Block, fractional part for owners and renters

Book, average pages read per day

fractional part read in

Pre- quency	Page and Example	Process	Classification
1	111 ⁵	Addition and subtraction	Purely artificial
1	243 ²	Reading decimals	Here exercise
1	31 ²	Reading	Here exercise
1	243 ⁸	Reading decimals	Here exercise
1	231 ⁵	Division of mixed numbers	Purely artificial
1	109 ²	Multiplication and addition	Purely artificial
1	6 ²	Addition	Sample
3	106 ¹	Addition and subtraction	Possible
	135 ³	Addition of fractions	Purely artificial
	135 ⁴	Addition of mixed numbers	Possible
1	17 ¹	Subtraction	Sample
1	251 ²	Subtraction	Purely artificial
1	137 ³	Addition of mixed numbers	Purely artificial
1	217 ³	Multiplication, subtraction, and division	Purely artificial
1	215 ²	Multiplication and subtraction	Possible
1	136 ¹	Addition of mixed numbers	Sample
1	118 ⁵	Subtraction	Purely artificial
1	67 ⁵	Division	Purely artificial
2	131 ¹	Addition of fractions	Sample
	151 ¹	Subtraction of fractions	Sample

Situation

Book, fractional part read in

number of page left to read in

Books, average number of pages read in by children

cost of dictionaries

difference in number of pages two children read

fractional part read

needed for each pupil

stamping name of school in

Bottles, needed to hold olive oil

Cells, planted in row

Trips, number of trips made in transporting children to school

Fare, fractional part paid

Butter, pounds cafeteria uses during a week

Cakes, bought for school party

Calves, average cost of

Camp, cost of board per week

groups of children using

total expenses of Boy Scouts at

Camping outfit, cost of to Boy Scout Troop

Marals, length of

Candy, amount made

amount of money received from sale of

Pre- quency	Page and Example	Process	Classification
1	151 ²	Subtraction of fractions	Purely artificial
1	21 ¹	Subtraction	Possible
1	73 ²	Division	Possible
1	264 ²	Multiplication	Sample
1	21 ³	Subtraction	Possible
1	118 ¹	Subtraction of fractions	Purely artificial
1	11 ³	Subtraction	Possible
1	10 ³	Addition	Possible
1	87 ²	Division	Fact question
1	83 ³	Division	Sample
1	32 ¹¹	Writing numbers	Mere exercise
1	118 ⁷	None	Mere exercise
1	230 ²	Multiplication of mixed numbers	Purely artificial
1	53 ⁵	Division	Possible
1	78 ³	Division	Purely artificial
1	271 ⁷	Division	Purely artificial
1	66 ¹	Division	Sample
1	48 ⁴	Multiplication	Possible
1	73 ⁴	Division	Purely artificial
1	256 ³	Addition of decimals	Purely artificial
1	107 ⁴	Addition and subtraction	Possible
1	183 ²	Multiplication of mixed numbers	Purely artificial

Situation

Candy, bars of for sale

bought

boxes of for sale

boxes needed for

cost of for party

difference in price at two stores

ounces in bags

pieces divided

pounds made by dealer

profit from sale of

Candy bars, cost of

fractional part eaten

profit from sale of

share equally

Carpet, yards required to cover floor

Carrots, amount received from sale of

Cattle, number of cars needed to transport

Cement walk, cost of

Frequency	Page and Example	Process	Classification
1	189 ²	Division of fractions	Purely artificial
1	208 ³	Division and multiplication	Purely artificial
1	189 ¹	Division of fractions	Purely artificial
1	235 ⁶	Division of mixed numbers	Purely artificial
1	263 ⁴	Multiplication	Possible
1	111 ¹	Division and subtraction	Purely artificial
1	211 ⁶	Division	Purely artificial
1	185 ¹	Division of fractions	Sample
1	235 ¹	Addition of mixed numbers	Purely artificial
1	266 ²	Multiplication and subtraction	Purely artificial
1	199 ⁶	Multiplication and division	Purely artificial
2	236 ¹	None	Sample
	236 ²	None	Mere exercise
1	199 ⁷	Multiplication and subtraction	Purely artificial
1	165 ²	Multiplication of fractions	Sample
1	222 ⁴	Multiplication and division	Purely artificial
1	268 ³	Division	Sample
1	35 ¹	Division	Sample
1	215 ⁵	Multiplication	Purely artificial

Situation

Chains, paper ones made by children

Chart, made for sale of candy

Chickens, amount received from sale of

average price of

Christmas cards, amount earned selling

printed

Circus, amount of food fed to animals in

making problems about

number of animals in

Clth, bought for dresses

cost of

linen bought

needed for aprons

needed for blouses

needed for costumes

Frequency	Page and Example	Process	Classification
1	187 ¹	Division of fractions	Sample
1	183 ¹	Reading	Mere exercise
2	180 ¹	Multiplication of mixed numbers	Sample
	180 ²	Multiplication of mixed numbers	Purely artificial
1	90 ¹	Division	Sample
1	109 ⁵	Division and multiplication	Purely artificial
1	110 ¹	Addition	Possible
2	1 ^{2,3}	Addition	Purely artificial
1	1 ⁴	None	Possible
1	1 ¹	Addition	Purely artificial
1	231 ⁴	Addition of mixed numbers	Possible
4	57 ¹	Division and multiplication	Sample
	195 ^{3,4}	Multiplication of mixed numbers	Possible
	269 ⁴	Division and multiplication	Sample
2	164 ²	Multiplication of fractions	Sample
	195 ³	Multiplication of fractions	Possible
1	195 ¹	Multiplication of mixed numbers	Possible
1	152 ⁴	Addition of mixed numbers	Purely artificial
5	172 ¹	Multiplication of mixed numbers	Sample
	172 ^{2,3,4}	Multiplication of mixed numbers	Possible
	235 ²	Division of mixed numbers	Possible

Situation

Cloth, needed for curtains in play house

needed for doll's dresses

needed for dresses

silk needed

Clothing, average price of coats

cost of coat

cost of each overcoat

cost of each suit

cost of materials for making dress

cost of shirt

cost of winter outfit

finding difference in original and sale price

making problems on buying at a sale

profit on sale of shirts

Coal, cost of

Fractional part of ton in load

tons delivered

tons sold

Frequency	Page and Example	Process	Classification
2	131 ^{4,5}	Addition of fractions	Sample
3	132 ^{1,2}	Addition of fractions	Possible
	108 ¹	Division of fractions	Sample
1	194 ¹	Division of mixed numbers	Sample
1	141 ¹	Subtraction of mixed numbers	Sample
1	59 ⁵	Addition and division	Purely artificial
1	112 ¹	Subtraction	Possible
1	67 ²	Division	Purely artificial
3	75 ¹	Division	Sample
	75 ²	Division	Purely artificial
	87 ¹		
1	10 ¹	Addition	Purely artificial
1	199 ⁴	Multiplication and division	Purely artificial
1	105 ¹⁰	Addition	Possible
6	18 ^{1,2,3,4,5}	Subtraction	Possible
	258 ¹		
1	18 ⁶	None	Purely artificial
1	199 ⁵	Subtraction and multiplication	Purely artificial
2	110 ⁵	Multiplication and subtraction	Purely artificial
	209 ⁷	Division and multiplication	Purely artificial
1	271 ²	Division	Purely artificial
1	208 ⁵	Addition and division	Purely artificial
1	211	Division	Purely artificial

Situation

Cookies, baked for school party

cost of

shared equally

Corn, average bushels per acre

bushels in crop

bushels in load

ears sold

price per bushel

Cost of items listed

Days, number before birthday

Diagrams, drawn to scale

Frequency	Page and Example	Process	Classification
1	80 ²	Division	Possible
2	55 ⁶	Multiplication and subtraction	Possible
	263 ³	Multiplication	Possible
1	54 ¹	Division	Sample
1	101 ²	Division	Purely artificial
1	277 ²	Multiplication of decimals	Purely artificial
1	209 ¹⁰	Division	Purely artificial
1	271 ¹	Division	Purely artificial
1	101 ⁵	Division	Purely artificial
10	33 ³ 267 ⁶ 276 ¹	Addition	Possible
	179 ¹	Multiplication of mixed numbers	Sample
	179 ²	Multiplication of mixed numbers	Possible
	184 ⁶	Multiplication of mixed numbers, and addition	Possible
	184 ⁷	Multiplication of mixed numbers, addition and subtraction	Purely artificial
	199 ³	Multiplication and subtraction	Possible
	231 ⁸	Multiplication of fractions, and addition	Purely artificial
	248 ¹	Addition	Sample
1	140 ⁶	Subtraction of mixed numbers	Possible
5	223 ¹	Division and multiplication	Possible
	223 ²	Measuring	More exercise
	223 ³	Reading	More exercise
	224 ²	Division	Possible
	229 ¹	Measuring and division	More exercise

Situation

Diagrams, finding measurements on

Diamonds, cost of

weight of largest

Dishes, hours spent washing

Distance, of sun and moon from the earth

Dog, cost of collar for

Dolls, cost of

Eggs, collected

cost of for cake

delivered

in incubator

sold

Farm, acres planted to grain

price received per acre

value of

Farm wages, average in country

Frequency	Page and Example	Process	Classification
5	223 ^{4,5} 224 ^{1,3} 229 ³	Measuring and multiplication	Possible
1	32 ¹³	Writing numbers	Mere exercise
1	243 ⁶	Reading decimals	Mere exercise
2	146 ⁴	Addition of fractions	Sample
	211 ²	None	Fact question
1	31 ⁶	Reading	Mere exercise
1	109 ⁴	Multiplication and addition	Possible
1	86 ²	Division	Sample
4	89 ² 198 ⁴	Division Division and multiplication	Purely artificial Possible
	232 ¹	Addition of mixed numbers	Possible
	106 ²	Addition and subtraction	Purely artificial
1	103 ⁴	Division	Purely artificial
1	35 ¹	Multiplication	Sample
1	68 ¹	Division	Sample
3	157 ¹	Subtraction of mixed numbers	Sample
	157 ²	Subtraction of mixed numbers	Purely artificial
	198 ³	Multiplication	Possible
3	216 ¹	Multiplication and division	Sample
	216 ^{2,3}	Multiplication and division	Purely artificial
1	100 ¹	Division	Sample
2	42 ¹ 89 ⁵	Multiplication Division	Sample Purely artificial
1	243 ³	Reading decimals	Mere exercise

Situation

Fire, difference in number started in certain period

value of clothing destroyed by

value of property destroyed by

Fire department, bonus received by members

Fish, minnows caught

pounds caught

Fish pond, square feet in

Flashlight, distance light is thrown from

Food, cost of baskets filled for Thanksgiving

Fruit, cost of

number of jars given away

Game, fractional part of tenpins knocked down

number of yards gained in

Garden, acres of vegetables planted in

difference in size of

length of

square feet in

Gas, average cost of

Gasoline, average miles per gallon

cost of

Frequency	Page and Example	Process	Classification
1	89 ³	Subtraction	Purely artificial
1	43 ¹	Multiplication	Sample
1	32 ⁹	Reading	Mere exercise
1	77 ¹	Division and multiplication	Sample
2	198 ¹ 198 ²	Multiplication Division	Fact question Fact question
1	149 ¹	Addition of fractions	Sample
1	218 ³	Multiplication	Purely artificial
1	105 ⁴	Multiplication of fractions	Purely artificial
1	89 ⁶	Division	Possible
1	109 ³	Multiplication and addition	Possible
1	72 ¹	Division	Sample
2	237 ^{1,2}	None	Mere exercise
1	2 ¹	Addition	Sample
1	217 ¹	Multiplication	Purely artificial
1	218 ²	Multiplication	Possible
1	237 ³	Subtraction of decimals	Purely artificial
1	215 ¹	Multiplication	Purely artificial
2	102 ¹ 277 ³	Division	Purely artificial
2	90 ² 230 ¹	Division Subtraction of mixed numbers	Possible Sample
2	80 ³ 67 ³ 277 ⁵	Division Multiplication	Purely artificial Possible

Situation

Gasoline, cost of plus oil

gallons needed on trip

guessing price signs of

Glass, area of piece for table covering

Golf balls, sold

Golf course, feet in

Graphs, finding difference in food prices on

rescuing

Groceries, average cost per day

Grocery store, hours worked in

Gymnasium built, cost of

Hate, difference in cost of two

Head band, inches made on

Height, difference in children

Hens, exhibited in poultry show

Hill house, nest house made for

Horses, cost of feed for

House, dimensions of rooms in

Hunting, lifetime, cost of

Ice cream, cost of for party

Frequency	Page and Example	Process	Classification
1	206 ⁵	Multiplication and addition	Possible
1	73 ⁶	Division	Possible
1	24 ¹	Reading	Mere exercise
1	215 ⁴	Multiplication	Purely artificial
1	155 ¹	Subtraction of mixed numbers	Sample
1	95 ¹	Multiplication	Fact question
3	228 ⁵	Division and multiplication	Purely artificial
	228 ⁴	Subtraction	Purely artificial
	228 ⁵	Subtraction and multiplication	Purely artificial
4	227 ^{1,2} 228 ^{1,2}	None	Mere exercise
1	102 ²	Division	Purely artificial
1	231 ²	Multiplication of mixed numbers	Purely artificial
1	267 ¹	Addition	Possible
1	20 ¹¹	Subtraction	Possible
2	152 ^{2,3}	Addition of mixed numbers	Purely artificial
5	201 ^{1,2,3,4,5}	Multiplication, addition, and subtraction	Possible
1	11 ¹	Subtraction	Sample
1	69 ¹	Division	Sample
1	36 ¹	Multiplication	Sample
6	221 ^{1,2,3} 222 ^{1,2,3}	Reading	Mere exercise
1	105 ⁵	Addition	Purely artificial
1	263 ⁵	Multiplication	Possible

Estimation

Ice cream, nints bought

Indians, number in United States at different times

Insurance company, expectation of life of child ten years old

Rate, length of string on

sill used for

Face, amount left on bolt

For trimming doll dresses

needed for doll pillows

needed for edging

yards used

used for handkerchiefs

Lawrence (Japanese), cost of

lawn, cost of sodding

grass seed needed for

Levynade, glasses filled with

sold

Letters, fractional part written

Frequency	Page and Example	Process	Classification
1	164 ¹	Multiplication of fractions	Sample
1	31 ¹	Reading	Merely exercise
1	243 ⁵	Reading decimals	Merely exercise
1	200 ⁵	Division	Purely artificial
1	200 ⁷	Multiplication of fractions, and subtraction	Purely artificial
2	133 ^{1,2}	Subtraction of mixed numbers	Sample
1	132 ³	Addition of fractions	Possible
1	134 ²	Subtraction of fractions	Sample
2	200 ³ 220 ¹	Division Addition, multiplication, and division	Purely artificial Possible
1	106 ³	Addition and subtraction	Purely artificial
1	271 ³	Division of decimals	Purely artificial
1	36 ¹	Division	Sample
1	215 ³	Multiplication and division	Purely artificial
1	217 ⁴	Multiplication and division	Purely artificial
2	171 ^{1,2}	Changing mixed numbers to improper fractions	Sample
1	206 ⁴	Addition and division	Possible
1	118 ⁶	Subtraction of fractions	Purely artificial

Situation

Lettuce, amount received from sale of

Library, amount needed to purchase books and magazines for
 amount spent for books and magazines in three years
 carrying books to class rooms from
 difference in number of cards distributed in two months
 number of books in good condition

Light, cost of for a year

Line, needed to mark football field

Lot, acres in

fencing needed for

width necessary for house

Lunchroom, pupils eating in

Magazine, difference in cost of two

Map, explanation of scale of

finding distances on according to scale given

Meals, cost of

Measures, changing pounds and ounces to mixed numbers

difference in length of meter and yard

difference in perimeters

difference in sea and land mile

expressing feet in fractions of a yard

Frequency	Page and Example	Process	Classification
1	229 ⁶	Subtraction and multiplication	Purely artificial
1	21 ⁵	Subtraction	Possible
1	21 ⁶	Addition	Possible
1	21 ²	Addition	Possible
1	21 ⁴	Subtraction	Possible
1	24 ²	Subtraction	Possible
1	112 ⁷	Multiplication	Purely artificial
1	5 ¹	Addition	Sample
3	218 ^{1,6,7}	Multiplication	Fact question
1	220 ³	Addition and multiplication	Purely artificial
1	222 ⁵	Addition	Purely artificial
1	90 ³	Division	Possible
1	24 ⁴	Subtraction	Possible
1	226 ¹	Reading	Here exercise
13	225 ^{1,2,3,4,5,6,7} 226 ^{2,3,4,5,6,7}	Measuring and multiplication	Purely artificial
1	205 ³	Addition and multiplication	Purely artificial
2	127 ^{2,5}	Division and addition of fractions	Purely artificial
1	258 ⁵	Subtraction	Possible
1	220 ⁴	Addition, multiplication, and subtraction	Purely artificial
1	26e ³	Subtraction	Purely artificial
1	116 ⁴	None	Here exercise

THE HISTORY OF THE

REIGN OF
HIS MOST EXCELLENT MAJESTY
CHARLES THE FIRST
BY
JAMES HALLAM, ESQ.
OF THE MIDDLE TEMPLE, ESQ.

LONDON:
Printed by J. Sturges, in Pall-mall.

1764.

IN TWO VOLUMES.

THE FIRST.

THE SECOND.

THE THIRD.

THE FOURTH.

THE FIFTH.

THE SIXTH.

THE SEVENTH.

THE EIGHTH.

THE NINTH.

THE TENTH.

THE ELEVENTH.

THE TWELFTH.

Situation

measures, expressing inches in fractions of a foot
 expressing pecks in fractions of a bushel
 expressing pints in fractions of a quart
 expressing quarts in fractions of a peck
 William Alan's

inches in given number of feet
 perimeter of rectangles

square feet in acre
 square feet in square rods
 yards in rods

cost, cost of

pounds of steak bought

miles, average number covered in bicycle race

average number driven per day

average number driven per hour

average speed per hour

average walking per hour

Fre- quency	Page and Example	Process	Classification
1	117 ³	None	Mere exercise
1	116 ⁵	None	Mere exercise
1	116 ³	None	Mere exercise
1	116 ⁶	None	Mere exercise
26	207 ⁶ , 208 ¹¹ , 217 ⁶ 233 ^{15, 18, 21, 22} 233 ^{1, 2, 3, 4, 5, 6, 7, 8} 235 ^{9, 10, 11, 12, 13, 14} 233 ^{16, 19, 20}	Multiplication or division None	Fact question Fact question
	233 ^{17, 23}	Subtraction	Fact question
1	95 ¹⁷	Multiplication	Fact question
2	220 ² 229 ²	Addition and multiplication	Fact question
1	218 ⁵	Multiplication	Fact question
1	218 ⁴	Multiplication	Fact question
1	267 ⁴	None	Mere exercise
13	45 ^{1, 2, 3, 4, 5, 6, 7, 8} 45 ^{10, 11, 12}	Multiplication Multiplication	Sample Purely artificial
1	208 ¹	Multiplication of mixed numbers	Purely artificial
1	267 ⁵	Multiplication of decimals	Purely artificial
2	58 ² 59 ⁶	Addition and division	Possible
2	58 ¹ 231 ⁷	Addition and division Multiplication of fractions	Sample Purely artificial
2	268 ² 269 ⁵	Division of decimals	Sample
1	231 ³	Division of mixed numbers	Purely artificial

Situation

flies, aviator flies in given number of hours
between cities

camp fire girls hiked

difference in number on two routes

difference in number walked

driven in given time

flown in trip around the world

hiked to camp

hiked at scout camp

number railmen walks

of pavement built

police walk on beat

ridden on bicycles

rowed at scout camp

train averages per hour

Fre- quency	Page and Example	Process	Classification
1	48 ⁶	Multiplication	Purely artificial
1	256 ⁴	Addition of decimals	Purely artificial
1	132 ¹	Addition of mixed numbers	Sample
1	253 ³	Subtraction of decimals	Purely artificial
1	156 ¹	Subtraction of mixed numbers	Sample
4	260 ¹ 264 ¹	Multiplication of decimals	Sample
	260 ^{1,3}	Multiplication of decimals	Purely artificial
1	31 ³	Reading	Mere exercise
2	202 ³	Multiplication of mixed numbers	Purely artificial
	256 ²	Addition of decimals	Purely artificial
2	137 ^{1,2}	Addition of mixed numbers	Purely artificial
1	265 ²	Multiplication of decimals	Sample
1	277 ⁶	Addition of decimals	Purely artificial
1	202 ¹	Division of mixed numbers	Purely artificial
2	141 ²	Subtraction of mixed numbers	Sample
	193 ²	Division of mixed numbers	Possible
1	137 ⁴	Addition of mixed numbers and division	Purely artificial
1	271 ⁶	Division of decimals	Purely artificial

Situation

files, walked down stairs

walked each day

walked in parade

walked in playing golf

Will, bottled at dairy

cost of her month

cups needed for custard

allons cafeteria uses each day

pints used

quarts used in given time

Wills, amount received for skins

files walked to visit traps of

sharing amount received for skins

money, amount earned

Fre- quency	Page and Example	Process	Classification
1	145 ¹	Addition of fractions	Possible
1	163 ⁴	Addition of fractions	Purely artificial
1	265 ⁶	Multiplication of decimals	Purely artificial
2	203 ¹	Addition and division	Purely artificial
	203 ²	Multiplication, addition and division	Purely artificial
1	206 ²	Multiplication	Purely artificial
1	206 ³	Multiplication, division, and addition	Possible
1	166 ¹	Multiplication of fractions	Purely artificial
1	230 ³	Division	Purely artificial
2	191 ¹	Division of mixed numbers	Sample
	206 ¹	Multiplication	Possible
1	211 ⁴	Division and multiplication	Purely artificial
1	104 ¹	Multiplication	Purely artificial
1	104 ³	Multiplication	Purely artificial
1	104 ²	Division	Purely artificial
9	103 ⁷	Multiplication	Purely artificial
	107 ⁵ 205 ³	Addition and subtraction	Possible
	117 ²	Subtraction of fractions	Purely artificial
	184 ^{1,2}	Multiplication of mixed numbers	Purely artificial
	184 ^{3,5}	Addition and multiplication of mixed numbers	Purely artificial
	184 ⁴	Addition	Purely artificial

Situation

one, amount earned in a given length of time

allowance received

amount needed to purchase articles desired

amount of change received from purchase of articles

amount of change received from purchase of tickets

amount owed

amount not in home bank

amount school books per week

amount spent for gas, light and water

average amount earned in a given length of time

average expenses for family per day

difference in amount rooms bank

expressing cents in fractions of nickels and dimes

expressing pennies in fractions and decimals

fractional part of pennies spent

receiving change at school supply store

saved for basketball game

spent for laundry

Frequency	Page and Example	Process	Classification
2	56 ¹	Division and multiplication	Sample
	108 ¹	Multiplication and addition	Sample
1	267 ²	Multiplication	Possible
10	11 ² 24 ³ 33 ² 88 ¹ 112 ³	Subtraction	Possible
	24 ⁶ 88 ³	Addition	Possible
	88 ² 89 ⁴	Division	Possible
	186 ⁷	Division of fractions	Purely artificial
3	20 ¹ 20 ¹	Addition	Possible
	20 ¹ 184	Addition and subtraction	Possible
1	111 ³	Multiplication and subtraction	Purely artificial
1	140 ⁶	Subtraction of mixed numbers	Purely artificial
1	67 ⁶	Division	Possible
1	103 ²	Addition	Possible
1	111 ²	Addition and division	Purely artificial
1	61 ³	Division	Sample
1	91 ¹	Division	Sample
1	103 ³	Subtraction	Possible
2	117 ^{3,4}	None	Mere exercise
7	242 ^{1,6,5} 245 ^{1,5,3,4}	None	Mere exercise
1	118 ²	Subtraction of fractions	Purely artificial
5	19 ¹ 19 ¹	Addition	Sample
	192 ^{3,4,5}	Addition	Possible
1	80 ¹	Division	Possible
1	209 ⁶	Addition and multiplication	Purely artificial

Situation

Money, Sunday School saved to buy Xmas books

total amount had

total amount to be allowed for expenses

value of coins

picture show, expenses of shared equally

minutes practiced in one month

stand, cost of

national fair show, prizes at

average bushels of victory gathered

boxes of walnuts sold

Cats, bushels in load

bushels in hand

price per bushel

quarts fed horses per day

sold

Office, length of

office building, average number of workers on each floor

cost of construction

price, field from bed

price, cost of

dozens bought

Fre- quency	Page and Example	Process	Classification
1	78 ⁷	Division	Purely artificial
2	126 ¹ 144 ¹	Division and addition Addition of fractions	Sample Possible
1	53 ⁴	Addition	Purely artificial
1	184 ⁹	Division	Possible
1	86 ⁵	Division	Possible
1	41 ¹	Multiplication	Sample
1	266 ¹	Subtraction	Possible
1	105 ⁶	Addition	Purely artificial
1	232 ⁴	Division of mixed numbers	Purely artificial
1	207 ⁵	Multiplication	Possible
1	271 ⁵	Division	Purely artificial
1	207 ⁴	Multiplication and division	Purely artificial
1	101 ³	Division	Purely artificial
2	211 ⁷ 251 ⁶	Multiplication and division	Purely artificial
1	265 ¹	Multiplication	Sample
1	215 ⁵	Division	Purely artificial
1	78 ⁶	Division	Purely artificial
1	206 ⁶	Multiplication	Purely artificial
1	229 ⁴	Division and multiplication	Purely artificial
1	55 ⁵	Division	Possible
1	163 ³	Addition of mixed numbers	Possible

Situation

Cramped, number 6 a 2 filled with

Paper, divided into squares

for drawing class

number of sheets of typewriting

adises of

used for posters

Parers, amount received from sale of

average amount earned delivering

number sold

sold by class

Parade, until marching to home

Paper, cost of paper and paper card for

Parade, cost of

Parade, cost of

Par, difference between original and sales price

Par, amount received from sale of

Pencil, cost of

profit from sale of

For holders, profit from sale of

Parade, hours practiced on

Frequency	Page and Example	Process	Classification
1	67 ²	Division	Purely artificial
3	241 ^{1,2} 244 ²	More	More exercise
1	71 ¹	Division	Sample
1	43 ²	Multiplication	Sample
1	103 ⁵	Division	Purely artificial
1	73 ¹	Division	Purely artificial
1	34 ¹	Multiplication	Possible
1	59 ¹	Addition and division	Purely artificial
1	53 ¹	Division and multiplication	Sample
1	10 ²	Addition	Possible
3	60 ^{1,2} 39 ¹	Division Division	Sample Possible
2	203 ^{1,2}	Multiplication	Possible
1	215 ⁹	Division and multiplication	Purely artificial
1	271 ⁴	Division	Possible
1	256 ²	Subtraction	Possible
1	110 ⁶	Division and multiplication	Purely artificial
1	199 ²	Division and multiplication	Purely artificial
1	210 ²	Multiplication and subtraction	Purely artificial
1	199 ¹	Multiplication and subtraction	Purely artificial
2	150 ¹ 204 ¹	Addition of fractions Addition and division	Sample Possible

Situation

Piano classes, number in school

Picnic, children attending

Food class bought for

Pic, amount eaten

Pie - least, amount received from sale of

Food class, cost of

Population, cost of little in one year

Cost of pie, increase in number in United States

Potatoes, average bushel for acre

Bushels sold

Number of bushels given

Number of hills in a row

Prepared for dinner

Price per bushel

Present, cost of

Pie, cost class at given period

Number grown at school

Cost class for

Amount lent to be used for

As to, cost of food class for

Frequency	Page and Example	Process	Classification
1	65 ¹	Division	Sample
1	112 ⁴	Multiplication	Possible
4	49 ^{1,2,4}	Division	Possible
	49 ⁵	Division	Purely artificial
1	144 ²	Addition of fractions	Sample
1	111 ⁶	Division and multiplication	Possible
1	78 ⁵	Division	Purely artificial
1	32 ¹	Reading	Text exercise
1	28 ⁷	Subtraction	Purely artificial
1	211 ⁶	Multiplication	Purely artificial
1	138 ²	Division of fractions	Sample
1	135 ¹	Addition of fractions	Purely artificial
1	52 ⁴	Division and multiplication	Sample
1	117 ¹	Addition and subtraction of fractions	Purely artificial
1	101 ⁶	Division	Purely artificial
1	112 ⁵	Addition	Possible
1	107 ⁷	Addition and subtraction	Purely artificial
1	12 ¹	Subtraction	Sample
1	75 ⁵	Division	Possible
1	11 ²	Subtraction	Possible
1	270 ³	Addition	Purely artificial

Situation

Radio, cost of

school wants to buy

fishes, amount earned from sale of

bunches of apples from bed

1910-1911, average number of books in year

barbarians, amount earned from sale of

math test, difference in scores on

engine, increasing

making half of

making one-fourth of

red roses, total amount brought for

white race, number of boys or girls in

time taken to run

restaurant, miles used in

pounds of butter used in one day in

Frequency	Page and Example	Process	Classification
1	111 ⁴	Multiplication, addition and subtraction	Purely artificial
1	277 ⁴	Multiplication and addition	Possible
1	110 ¹	Division and multiplication	Possible
1	229 ⁵	Multiplication	Purely artificial
1	276 ⁵	Multiplication of decimals	Purely artificial
1	207 ⁵	Multiplication	Possible
1	276 ⁴	Subtraction and division of decimals	Possible
2	177 ¹	Multiplication of fractions	Sample
	177 ²	Multiplication of fractions	Possible
3	175 ¹	Multiplication of fractions	Sample
	175 ⁵ 176 ⁵	Multiplication of fractions	Possible
1	168 ¹	Multiplication of fractions	Sample
1	24 ⁵	Addition	Possible
1	165 ²	Division of fractions	Sample
3	153 ^{2,5,5}	Addition of mixed numbers	Possible
1	126 ¹	Division of fractions	Purely artificial
1	194 ²	Division of mixed numbers	Purely artificial

Situation

ribbon, cost of

used to wrap packages

yards needed

rice, pounds served

Roman numerals, location in books and magazines
reading

writing

rose bushes, number in garden

number trimmed

rope, cost of

room, width of floor space on each side

rope, amount of string from

average children from trees

school, classes attended during day

fractional part of week attended

hours spent in

school building, number in United States in given year

school garden, number of states needed for

school orchestra, amount of money raised by boys in

school picnic, bus fare to take children on

Frequency	Page and Example	Process	Classification
1	174 ¹	Multiplication of mixed numbers	Sample
1	185 ³	Division of fractions	Sample
1	210 ³	Multiplication and division	Purely artificial
1	191 ²	Division of mixed numbers	Purely artificial
2	26 ³ 27 ⁶	Reading	Mere exercise
3	27 ¹ , 27 ² , 27 ³ , 27 ⁴	None	Mere exercise
3	25 ¹ , 26 ¹ , 26 ²	None	Mere exercise
1	48 ³	Multiplication	Possible
1	117 ⁶	None	Mere exercise
1	103 ¹	Division	Possible
1	222 ⁴	Subtraction and division	Purely artificial
1	91 ⁶	Division	Possible
1	115 ⁵	Division	Possible
1	186 ⁵	Division of fractions	Purely artificial
1	118 ⁴	None	Mere exercise
1	163 ⁵	Addition, and subtraction of fractions	Purely artificial
1	32 ¹²	Writing numbers	Mere exercise
1	48 ¹	Multiplication	Possible
1	48 ¹	Multiplication	Possible
1	73 ³	Division	Possible

Situation

school room, cost of furniture for
measuring

school store, cost of supplies for

school supplies, cost of
number of tablets bought

scissors, cost of

cost, amount received from sale of
stis, cost of

ski-jump, difference in feet jumped
sled, cost shared by boys

work blocks, cost of

year, cost of

unemployment, reason for increase or
falling, average score on test

words spelled right on test

turns, stamps needed to fill

stamps, cost of

number of foreign

stamps, hours worked in

Frequency	Page and Example	Process	Classification
1	78 ⁴	Multiplication	Possible
4	200 ⁵ 200 ⁶ 200 ⁵ 201 ⁶ 210 ¹	Division Multiplication Multiplication and division	Possible Purely artificial Sample
6	44 ⁵ 44 ⁶ 44 ⁵ 44 ⁶	Multiplication Multiplication	Sample Purely artificial
1	10 ⁴	Addition	Purely artificial
1	67 ⁴	Division	Possible
1	109 ⁷	Division and subtraction	Purely artificial
1	34 ⁷	Multiplication	Purely artificial
1	105 ⁵	Subtraction	Possible
1	105 ⁹	Subtraction	Purely artificial
1	6 ⁵	Division	Purely artificial
1	105 ⁵	Addition	Possible
1	55 ⁷	Division, multiplication and addition	Sample
3	237 ³ 239 ¹	Reading decimals	Here exercise
1	59 ⁷	Addition and division	Possible
1	259 ⁹	Multiplication of decimals	Sample
1	39 ⁵	Multiplication	Sample
1	256 ¹	Addition	Possible
1	170 ¹	Multiplication of fractions	Sample
1	148 ⁶	Addition of fractions	Sample

Situation

Store, selling at grocery

strawberries, average amount picked

strawberry plants, number in patch

Star, rounds restaurant has on hand

Sunday School, people attending

Swimming tank, length of

Tall tower, square feet in

Tatting, yards made

Teeth, cost of fillings for

Telephone, difference in distances talked on in given years

Telescope, cost of

Ticket, cost of for basketball game

Tickets, amount received from sale of for school program

cost of

cost of for circus

Time, length between given hours

minutes from 12 is late

number of days in given number of hours

Frequency	Date and Example	Process	Classification
3	187 ¹ 127 ¹	Division of fractions Division of fractions	Sample Possible
2	190 ¹ 190 ²	Division of mixed numbers Division of mixed numbers	Sample Purely artificial
1	79 ²	Multiplication	Purely artificial
1	235 ²	Division of fractions	Purely artificial
1	32 ¹⁰	Writing numbers	Mere exercise
1	210 ¹	Division	Purely artificial
1	219 ²	Multiplication and division	Possible
1	134 ¹	Subtraction of fractions	Sample
1	259 ¹	Multiplication	Sample
1	21 ⁸	Subtraction	Purely artificial
1	51 ⁴	Reading	Mere exercise
1	268 ¹	Division and multiplication	Sample
2	40 ⁶ 110 ⁵	Multiplication Multiplication and addition	Possible Possible
1	34 ¹	Multiplication	Possible
1	276 ⁶	Multiplication and addition	Possible
1	95 ¹⁰	Reckoning time	Mere exercise
1	211 ¹	Addition	Possible
1	69 ²	Division	Sample

Situation

Time, number of days visited Grandmother

reckoning leap year

spent at work

spent in school

spent sleeping

spent studying

telling by burning a candle

train takes to run between stations

years in given centuries

Wire table, reading

Wire, difference in original and sale price

Tomatoes, amount earned from sale of

Tomatoe plants, set out

Track, difference in length of tracks

distance run per minute

length of track

Green, bundles of sold by nursery

Cost, cost of tickets for

expenses shared on

Frequency	Page and Example	Process	Classification
1	205 ⁶	Multiplication	Purely artificial
1	205 ⁵	Division	Possible
1	204 ⁴	Reckoning time	Purely artificial
2	204 ^{3, 2}	Reckoning time	Possible
1	211 ⁵	Division	Purely artificial
2	169 ³	Multiplication of fractions	Sample
	232 ⁵	Addition of mixed numbers	Possible
1	232 ⁶	Division of mixed numbers	Purely artificial
1	205 ¹	Reckoning time	Possible
1	205 ⁴	Multiplication	Purely artificial
1	233 ¹	Reading decimals	Here exercise
1	266 ⁴	Multiplication, addition and subtraction	Purely artificial
1	207 ³	Multiplication	Possible
1	217 ²	Division	Possible
1	210 ⁵	Multiplication and subtraction	Possible
2	192 ¹	Division of mixed numbers	Sample
	192 ⁶	Division of mixed numbers	Possible
1	202 ²	Division	Purely artificial
1	76 ¹	Division and multiplication	Sample
1	78 ¹	Multiplication	Possible
1	86 ⁴	Division	Possible

Situation

Trip, fractional part covered

Gasoline used on

Hours required to take

miles traveled or

Money saved or

Number of days spent on

part covered in time length of time

Wiring, cost of

rows of

Typewriter, cost of

Typewriting, speed per second

Vegetable, amount earned from sale of

average weight of carload of

Wine or, gallons sold

Wool, hours practiced on

Water cost of for year

Water way, cost of construction of

Weather, inches of snow fall

Frequency	Page and Example	Process	Classification
1	167 ¹	Multiplication of fractions	Sample
1	231 ¹	Subtraction	Purely artificial
1	163 ²	Addition of mixed numbers	Purely artificial
4	112 ² 258 ⁴ 248 ² 251 ¹	Subtraction Addition of decimals Subtraction of decimals	Possible Sample Sample
1	67	Division	Possible
1	100 ⁵	Division	Purely artificial
1	147 ¹	Addition of fractions	Sample
1	190 ⁵	Multiplication of mixed numbers	Purely artificial
1	83 ¹	Division	Sample
1	109 ⁶	Subtraction and division	Purely artificial
1	277 ¹	Division	Purely artificial
2	207 ¹ 24 ¹	Multiplication and addition Addition	Possible Possible
1	243 ⁴	Reading decimals	Mere exercise
1	211 ⁵	Multiplication	Purely artificial
1	135 ⁵	Addition of fractions	Possible
1	112 ⁵	Multiplication	Purely artificial
1	31 ⁵	Reading	Mere exercise
1	245 ⁵	Addition of decimals	Sample

Situation

Weather, record of rain fall

record of snow fall

Height, average of boys on basketball team

average of turtles

difference in

number pounds underweight

of automobile in tons

of rocks cleaned

ounces baby gained

pounds gained

pounds gained at camp

Heat, number of bushels or load

Wire, cost for fencing chicken yard

cost for fencing garden

cost for fencing rabbit pen

Writing test, minutes spent in taking

Pre- cency	Page and Example	Process	Classification
2	232 ³ . 243 ¹	Reading decimals	Here exercise
1	239 ²	Reading decimals	Here exercise
1	59 ⁴	Addition and division	Possible
1	101 ¹	Division	Purely artificial
1	163 ¹	Addition and subtraction of mixed numbers	Purely artificial
2	33 ⁵ 103 ⁶	Subtraction Addition	Possible Possible
1	200 ⁴	Division	Fact question
1	209 ⁶	Division and multiplication	Purely artificial
1	201 ²	Subtraction	Purely artificial
6	130 ^{1, 6} 140 ^{3, 4, 5} 232 ³	Subtraction of fractions Subtraction of fractions Subtraction of mixed numbers	Sample Possible Possible
1	235 ⁴	Addition of mixed numbers	Possible
2	101 ⁴ 209 ¹	Division	Purely artificial
2	210 ⁴ 266 ⁵	Multiplication	Purely artificial
1	220 ⁵	Addition, division and multiplication	Purely artificial
1	276 ²	Multiplication	Purely artificial
1	178 ¹	Multiplication of mixed numbers	Sample

Table III

Showing The Frequency In Book V
Of Types Of Problems As Explained On Page 13

Type Of Problem	Frequency
Sample	122
Fact Question	40
Here Exercise	81
Purely Artificial	258
Possible (Improbable)	192
Real Situation	<u>0</u>
<u>Total Number of Problems</u>	693

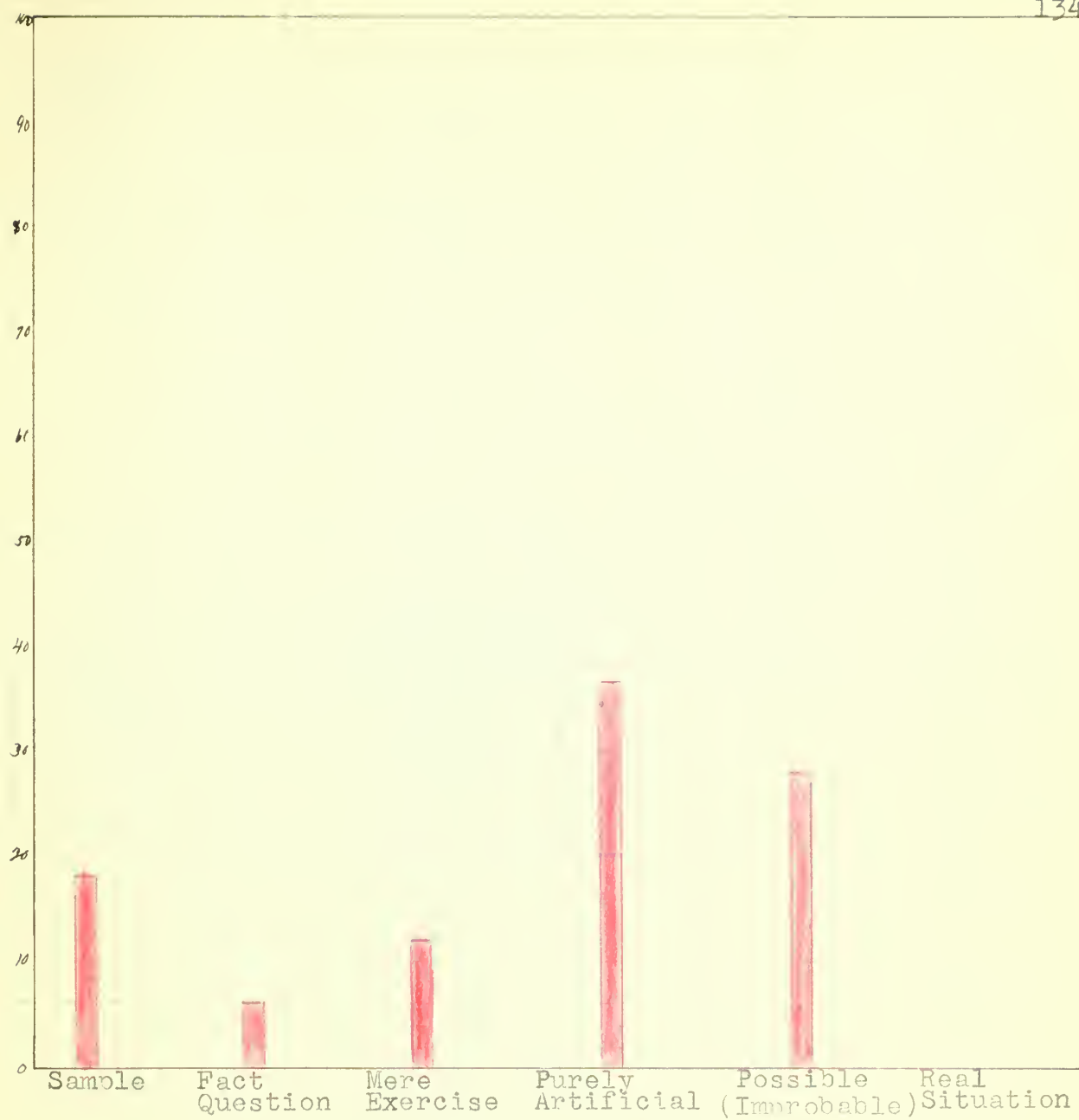


Fig. 3

Graphic Interpretation
of the Frequency of Types of Problems
in Book 5 as Shown in Table III

Detailed Analysis
of the
Problems in Book VI
Child Life Arithmetic Series

Situation

Acres, amount planted to beans

total in two pieces of land

fractional part of land sold

A c, of child

Apples, amount earned from sale of

amount in cellar

bushels of windfalls picked up

bushels sold

percent of profit from sale of

Area, difference between Canada and United States

difference in gardens

of floor

of gardeners

Airplane, average speed per hour

time required to cross ocean

Pre- cedence	Page and Example	Process	Classification*
1	59 ²	Multiplication of fractions	Purely artificial
1	34 ¹	Addition of fractions	Purely artificial
1	31 ⁴	Division	Purely artificial
1	143 ²	Multiplication and addition	Sample
1	197 ⁷	Multiplication of decimals	Possible
1	146 ⁶	Addition of compound denomi- nate numbers	Sample
1	37 ⁴	Addition of fractions	Purely artificial
2	45	Subtraction of mixed numbers	Possible
	187 ⁶	Multiplication of decimals and addition	Purely artificial
1	199 ¹	Multiplication, subtraction and division	Purely artificial
1	23 ⁴	Subtraction	Purely artificial
3	65 ⁶ 66 ^{5,6}	Addition and subtraction of mixed numbers	Possible
2	158 ¹ 158 ²	Multiplication Division	Purely artificial Purely artificial
9	65 ^{1,2,3,4,5} 66 ^{1,2,3,4}	Multiplication of mixed numbers	Possible
1	136 ⁵	Division of decimals	Purely artificial
1	121 ¹¹	Division of decimals	Purely artificial

Situation

Arithmetic, number of problems left to solve

Arithmetic test, per cent of examples correct

per cent of problems solved correctly

Automobile, average speed of

cost of

expenses first year

length of wheel base

reckoning down payments on

Bacon, cost of

Balloons, amount made from sale of

Bank, amount deposited in

amount in

amount left after withdrawal

amount withdrawn from

interest on account in

making out deposits slips

Baseball, difference of batting averages of league players

distances between bases

Pre- quency	Page and Example	Process	Classification
1	71 ⁶	Multiplication of mixed numbers	Purely artificial
1	237 ⁴	Division	Possible
1	196 ³	Division	Possible
1	21 ¹²	Division	Possible
1	231 ⁴	Multiplication of fractions	Purely artificial
3	24 ¹ 24 ^{2,3}	Addition Division	Possible Possible
1	144 ¹	Division	Sample
1	53 ⁴	Multiplication of fractions	Purely artificial
1	35 ¹	Addition and multiplication of fractions	Sample
1	187 ¹	Multiplication of decimals	Possible
1	26 ¹	Addition	Possible
1	60 ¹	Multiplication and addition	Sample
1	26 ³	Subtraction	Purely artificial
1	234 ⁴	Division	Sample
5	212 ¹ 214 ¹	Multiplication of decimals	Sample
	212 ^{2,3} 234 ²	Multiplication of decimals	Possible
4	175 ^{1,2,3} 177 ¹	Writing	Here exercise
1	97 ⁷	Subtraction of decimals	Possible
1	235 ⁵	Addition and division	Purely artificial

Situation

Baseball, standing of League teams

Baseball love, cost of

Barletball, percentage of games won

Basketball team, cost of railroad fare for each boy

Bills, discount on electric light

making out

making out receipts for

receipting

Bicycles, cost of equipment for

difference in cost of equipment for

distance ridden on

Blocks, cubic inches in pile

number in pile

Boards, needed for bird house

sawed for dog kennel

Boat races, difference in speed of winning boats

Book, average number of words on page in

fractional part read

fractional part left to read

Frequency	Page and Example	Process	Classification
4	194 ^{1,2,7,4}	Reading decimals	Here exercise
1	91 ¹	Division	Sample
11	193 ⁴ , 205 ^{1,2,3,4,5} 205 ^{6,7,8,9,10}	Division	Purely artificial
1	109 ¹	Division	Sample
1	211 ¹⁴	Multiplication of decimals	Possible
2	171 ^{1,2}	Multiplication and addition	Possible
4	172 ^{1,2,7,4}	None	Here exercise
1	171 ⁸	None	Here exercise
1	135 ¹	Addition	Possible
1	135 ²	Subtraction	Possible
1	223 ³	Subtraction of mixed numbers and multiplication	Purely artificial
2	160 ² 161 ²	Multiplication	Possible
1	160 ¹	Division and multiplication	Possible
1	79 ⁶	Multiplication of fractions	Possible
2	79 ⁴	Division of mixed numbers	Possible
	79 ⁵	Division and addition	Possible
1	96 ⁵	Subtraction of decimals	Purely artificial
1	26 ⁷	Multiplication	Purely artificial
1	30 ²	Division	Purely artificial
1	36 ³	Subtraction of fractions	Purely artificial

Situation

Book, pages read in

price of

books, cost of

discount on

Box, cubic feet of sand needed to fill

number of cubes in

volume of

Budget, planned for year

Business, per cent net profit is of cost

per cent net profit is of selling price

profit from for day

Busses, needed to transport pupils

Butter, average amount used in one day

books used

Butter fat, value of

Cake, fractional part served

number baked

Valves, price per pound

Barbers outfit, cost of

Warp, cost for attending

Frequency	Page and Example	Process	Classification
1	188 ¹⁰	Multiplication and addition	Purely artificial
1	126 ¹	Division	Sample
1	26 ¹	Addition	Possible
1	211 ¹³	Multiplication of decimals	Possible
1	162 ⁴	Multiplication of mixed numbers and division	Possible
1	161 ³	Multiplication	Purely artificial
1	162 ³	Multiplication	Possible
1	53 ²	Multiplication of fractions	Possible
1	200 ¹	Division	Sample
1	200 ²	Division	Sample
2	199 ^{4,5}	Addition	Possible
1	167 ¹	Division	Possible
1	77 ²	Division of fractions	Possible
1	37 ¹	Addition of fractions	Sample
1	18 ⁵	Multiplication	Purely artificial
1	37 ²	Addition of fractions	Purely artificial
1	76 ¹	Division of fractions	Purely artificial
1	131 ¹	Division	Purely artificial
1	93 ¹	Addition	Sample
1	6 ⁷	Multiplication	Possible

Situation

Camp, expenses at

Canal, ships passing through in given time

Canal zone, children in

population of

Candy, amount bought

amount given to sister

fractional part possible to buy

boards of fudge made

Candy bars, profit from sale of

Candy boxes, packed

Candy sale, total receipts from

Carpet, length of pattern on

wards needed for play house

Cash book, making out

Cattle, amount received from sale of

Cellar, number of cubic yards of dirt removed from

Chart, made for changes of food prices

made for pupil enrollment

Fre- quency	Page and Example	Process	Classification
1	132 ³	Division	Possible
1	221 ¹	Addition	Purely artificial
1	221 ³	Addition	Purely artificial
1	221 ²	Subtraction	Purely artificial
1	70 ⁴	Division and multiplication	Possible
1	59 ³	Multiplication of fractions	Purely artificial
1	31 ¹	Division	Purely artificial
1	61 ³	Multiplication of mixed numbers	Possible
1	199 ³	Multiplication, division and subtraction	Purely artificial
1	76 ³	Division of fractions	Purely artificial
1	53 ³	Multiplication of fractions	Purely artificial
1	109 ²	Division of decimals	Sample
1	154 ¹	Multiplication of compound denominate numbers	Sample
1	177 ²	Addition and subtraction	Possible
1	132 ²	Division and multiplication	Purely artificial
1	162 ²	Multiplication and division	Purely artificial
3	202 ^{2,3,4}	Reading	Mere exercise
1	9 ²	Addition	Possible

Situation

Cheese, amount bought

Cherries, quarts picked

Checks, filling out stubs

Chicken, average price per pound

cost of

difference in weight of two

price per pound

Chickens, per cent of different varieties

pounds of grit needed for

Cistern, gallons of water in

Cloth, amount left after cutting out dress

aprons made from given quantity

cost of

cost of cheesecloth

cost of for costumes

material needed for curtains

needed for towels

needed for dresses

Frequency	Page and Example	Process	Classification
1	70 ¹	Division	Purely artificial
1	182 ¹	Multiplication of decimals	Possible
2	174 ^{1,5}	Subtraction	Possible
1	111 ⁵	Division	Possible
1	69 ⁶	Multiplication of mixed numbers	Sample
1	149 ³	Subtraction of compound denominator numbers	Possible
1	25 ³	Division of mixed numbers	Possible
2	197 ^{5,7}	Division	Purely artificial
1	167 ³	Multiplication of fractions	Possible
2	230 ^{1,4}	Division of decimals	Purely artificial
1	79 ³	Subtraction of mixed numbers	Possible
1	79 ²	Division of mixed numbers	Possible
1	222 ²	Multiplication of mixed numbers	Possible
1	103 ³	Division	Sample
1	104 ²	Multiplication	Possible
1	51 ⁻	Addition of mixed numbers	Possible
1	71 ⁴	Multiplication of fractions	Possible
1	226 ³	Subtraction of mixed numbers	Possible

Situation

Cloth, needed for apron

pieces cut from

selling price of silk

silk divided equally between girls

silk used for dolls dresses

towels made from given quantity

finding, amount saved to purchase suit

cost of

cost of each baseball cap

cost of fur coat

cost of rain outfit

cost of shirts

per cent of money spent for sweater

percentage of wool in suit

selling price of cap

selling price of fur coat

Frequency	Page and Example	Process	Classification
1	133 ⁴	Addition and subtraction of mixed numbers	Possible
1	133 ³	Division of fractions	Possible
1	210 ²	Multiplication of decimals and subtraction	Possible
1	77 ¹	Division of fractions	Sample
1	57 ²	Multiplication of fractions	Possible
1	78 ⁵	Division of mixed numbers	Possible
1	134 ⁵	Multiplication of decimals	Purely artificial
7	7 ^{1,2,3,4,5}	Addition	Possible
	296 ¹	Addition and subtraction	Possible
	235 ¹	Multiplication of decimals and subtraction	Possible
1	108 ²	Division	Sample
1	71 ²	Multiplication of fractions	Possible
1	96 ¹	Addition	Possible
1	14 ¹	Multiplication	Sample
1	196 ²	Division	Possible
1	188 ⁶	None	Here exercise
1	210 ³	Multiplication of decimals and subtraction	Possible
1	210 ¹	Multiplication of decimals and subtraction	Sample

Situation

Clothing, socks, possible to buy with given amount of money

Coal, amount used

cost of

weight of load

Coffee, cost of

Cookies, amount bought

sugar used in making

Corn, average yield per acre

bushels raised

cost of for chicken feed

dozen ears sold

Cost of items listed

Cotton, average yield per acre

Pre- quency	Page and Example	Process	Classification
1	121 ¹	Division of decimals	Possible
1	235 ³	Division	Purely artificial
3	78 ¹	Division of mixed numbers	Possible
	101 ^{1,2}	Multiplication	Possible
	132 ²	Division and multiplication	Possible
1	25 ⁴	Subtraction and division	Purely artificial
2	25 ²	Multiplication of mixed numbers	Sample
	70 ²	Multiplication of fractions	Possible
1	70 ⁵	Division and multiplication	Purely artificial
2	223 ¹	Addition of mixed numbers	Possible
	223 ²	Subtraction of mixed numbers	Possible
1	51 ²	Subtraction of mixed numbers	Possible
1	101 ¹¹	Multiplication of decimals	Purely artificial
1	132 ⁴	Division and multiplication	Purely artificial
2	111 ^{1,2}	Division	Purely artificial
8	156 ^{2,3,4} 165 ³ 166 ³	Multiplication of compound den- ominate numbers	Possible
	156 ³	Multiplication of mixed numbers	Possible
	167 ²	Addition	Possible
1	104 ³	Multiplication of decimals	Purely artificial

Situation

Cream, number of pints milkman delivered

Days, number worked in week

Distance, walked on errand

Education, difference in cost per pupil in two states

Eggs, amount received from sale of

dozens sold

per cent hatched

profit from sale of

Erasers, cost of for school

Fish, weight of caught

Fishing, amount of bait for

difference in length of lines

distance of drop line from bottom of lake

Flour, cost of

Flowers, amount earned from sale of

Frequency	Page and Example	Process	Classification
2	55 ^{1,2}	Multiplication of fractions	Purely artificial
1	34 ⁴	Addition of fractions	Purely artificial
1	45 ¹	Subtraction of fractions	Purely artificial
1	96 ³	Subtraction	Possible
1	137 ¹²	Multiplication of decimals	Possible
2	23 ³ 52 ⁴	Multiplication Subtraction of mixed numbers	Possible Possible
1	196 ¹	Addition and division	Possible
1	71 ⁶	Multiplication of mixed numbers	Possible
1	133 ²	Division	Possible
3	150 ^{5,6,7}	Addition of compound denominate numbers	Possible
1	150 ²	Multiplication, addition and division	Purely artificial
1	150 ³	Subtraction of compound denominate numbers	Possible
1	150 ⁴	Subtraction of compound denominate numbers	Purely artificial
3	131 ⁴ 132 ⁵ 132 ⁷	Division Division and multiplication	Possible Possible
1	12 ⁷	Addition	Possible



Situation

Flowers, bunches of daffodils sold

per cent of sweet peas sold

Food, per cent of increase in price

Football outfit, cost of

Forest products, number of tons shipped

Fountain pens, left after sale

Fractions, changing to per cent equivalents

Furniture, cost of shipping

Garden, finding circumference of

per cent of different varieties of flowers in
square feet in

Gas, average cost per day

total bill for given period

Gasoline, average miles per gallon

fractional part of barrel used

gallons possible to buy with amount of money

Gold, difference in price in given years

increase in mint value of

Pre- quency	Page and Example	Process	Classification
1	76 ²	Division of fractions and multiplication	Possible
1	197 ⁵	Division	Possible
1	202 ¹	Subtraction and division	Purely artificial
1	3 ¹	Addition	Sample
1	95 ¹³	Addition of decimals	Purely artificial
1	71 ⁵	Multiplication and subtraction of fractions	Purely artificial
1	234 ³	Division	Possible
1	132 ⁵	Division and multiplication	Possible
1	104 ⁴	Multiplication of decimals	Purely artificial
1	197 ⁴	Division	Possible
1	6 ³	Multiplication	Possible
1	124 ⁷	Division	Purely artificial
1	23 ³	Addition	Possible
4	21 ¹³ 51 ³	Division Subtraction of mixed numbers	Possible Possible
	119 ¹ 122 ¹	Division of decimals	Sample
1	31 ³	Division	Possible
1	33 ⁷	Division of mixed numbers	Possible
1	97 ⁹	Subtraction	Possible
1	104 ⁵	Multiplication of decimals	Purely artificial

Situation

Golf course, difference in distance between holes
length of

Gravel, finding in newspaper and explaining
showing amount of gold in U.S. Treasury

showing amounts of money

showing amounts made in given periods

showing earnings of factory workers in given period

showing electrical appliances used in 1934

showing gold held in different countries

showing horses on farms in given period

showing number of workers employed

showing scores on test

Greeting cards, dozens sold

Groceries, average cost per day

Frequency	Page and Example	Process	Classification
1	11 ²	Subtraction	Purely artificial
3	11 ¹	Addition and division	Purely artificial
	11 ³	Addition, multiplication and division	Purely artificial
	11 ⁴	Addition	Purely artificial
1	219 ³	None	Mere exercise
6	191 ^{1,3,5}	Reading	Mere exercise
	191 ^{3,4,6}	Reading and subtraction	Purely artificial
1	219 ¹	Reading	Mere exercise
6	207 ¹	Subtraction and division	Purely artificial
	207 ^{2,4,5,6}	Reading	Mere exercise
	207 ³	Division	Purely artificial
3	204 ^{1,2,3}	Subtraction	Purely artificial
5	209 ^{1,2,3,4,5}	Multiplication	Purely artificial
4	192 ^{1,3,5}	Reading	Mere exercise
	192 ⁴	Reading and addition	Purely artificial
4	208 ¹	Counting and multiplication	Purely artificial
	208 ²	Multiplication, subtraction and division	Purely artificial
	208 ⁵	Multiplication and division	Purely artificial
	208 ⁴	None	Mere exercise
3	204 ^{4,5,6}	Subtraction	Purely artificial
5	220 ^{1,2,3,4}	Reading	Mere exercise
	220 ⁵	Subtraction	Possible
1	52 ³	Addition of mixed numbers	Possible
2	19 ¹	Division	Sample
	23 ²	Division	Possible

Situation

Groceries, cost of

Gain, per cent of profit from sale of

Harmonics, amount received from sale of

Harmonica, won in contest

Height, difference in of two children

of child

Hens, average price of

number left

Ice cream, amount spent for

average price per gallon

gallons needed for carnival

gallons sold

gallons sold in restaurant

Industries, value of products of

Jelly, amount in classes

Knife, cost of

Lamb, price of

Frequency	Page and Example	Process	Classification
2	18 ⁴ 235 ²	Addition Multiplication of decimals and addition	Possible Possible
1	199 ⁵	Multiplication, subtraction and division	Purely artificial
1	228 ³	Multiplication of mixed numbers and division	Purely artificial
1	125 ⁴	Division	Possible
2	140 ^{1,2}	Subtraction of compound denomi- nate numbers	Sample
1	143 ¹	Multiplication and addition	Sample
1	20 ³	Division	Possible
1	6 ⁵	Subtraction	Possible
1	206 ³	Multiplication and subtraction	Possible
1	118 ¹	Division	Sample
1	125 ⁵	Division	Possible
1	52 ⁵	Addition of mixed numbers	Purely artificial
1	74 ²	Addition of fractions	Purely artificial
1	2 ²	Reading	Verbal exercise
1	77 ³	Division of fractions	Possible
1	91 ³	Division	Purely artificial
1	111 ⁶	Subtraction and division	Purely artificial

Situation

Letters, number typed

Loss, per cent on articles sold

per cent on sale of auto

Lot, profit from sale of

Lumber, cost of

cost of flooring

number feet in given amount

Magazine, cost of a year

difference in price of per year

Measures, changing to compound denominate numbers

changing to higher denominations

changing to lower denominations

difference in American and British bushel

Billings blanks

quarter hours in given time

Situation

Measures, reducing compound denominate numbers

Boat, cost of

number round's cause to left

Miles, average speed per hour

distance between two points

distance between two villages in Russia

driven in given time

hired

rowed in boat

travelled during vacation

walked carrying lunch

Pre- quency	Page and Example	Process	Classification
14	143 ^{3,4,5,6,7,8,9} 143 ¹⁰ 151 ⁶ 152 ^{6,7} 164 ^{5,4,6}	Multiplication and addition	Fact question
5	25 ¹ 69 ¹ 69 ³ 156 ¹ 156 ²	Multiplication of mixed numbers Multiplication of mixed numbers Multiplication of mixed numbers Multiplication of compound de- nominate numbers Multiplication of compound de- nominate numbers	Possible Sample Purely artificial Sample Possible
1	45 ¹	Subtraction of mixed numbers	Sample
3	76 ⁵ 78 ² 156 ⁸	Division of fractions Division of mixed numbers Multiplication of compound de- nominate numbers	Possible Possible Purely artificial
2	85 ^{1,2}	Reading decimals	Mere exercise
1	136 ⁴	Multiplication of decimals	Purely artificial
4	24 ^{4,5,6} 226 ⁴	Subtraction Subtraction of decimals	Possible Possible
1	63 ¹	Multiplication of mixed numbers	Sample
1	44 ¹	Addition of mixed numbers	Sample
1	136 ³	Subtraction of decimals	Possible
1	55 ⁵	Multiplication of fractions	Possible

Situation

Miles, walked in given time

walked on errands

walked to school

walked to work

Mill, Gallons of buttermilk sold

million on wagon

Money, amount earned

amount earned by grade

amount needed to purchase articles desired

amount Railroad Company paid for operating expenses

amount Railroad Company received

amount of salary spent for rent, food, clothing

amount spent during month

articles possible to buy with given amount

dividing proceeds of carnival equally among clubs

Fractional part of dollar

Frequency	Page and Example	Process	Classification
1	228 ¹	Multiplication of mixed numbers or decimals	Sample
1	37 ²	Addition of fractions	Possible
2	56 ¹ 57 ³	Multiplication of fractions	Possible
1	71 ⁵	Multiplication of fractions	Purely artificial
1	42 ⁵	Addition of fractions	Purely artificial
1	144 ²	Division	Purely artificial
7	67 ¹ 23 ⁵ 68 ¹	Multiplication of mixed numbers	Purely artificial Sample
	67 ² 68 ²	Multiplication of mixed numbers	Purely artificial
	206 ¹	Addition and subtraction	Possible
	206 ⁵	Addition and multiplication of mixed numbers	Possible
1	136 ⁶	Addition	Purely artificial
1	167 ⁴	Subtraction	Possible
1	218 ⁵	Reading	Mere exercise
1	218 ⁴	Reading	Mere exercise
1	32 ²	Addition of fractions	Purely artificial
1	34 ³	Addition of fractions	Purely artificial
1	97 ¹²	Addition and subtraction	Possible
1	125 ⁵	Division	Possible
2	29 ^{1,2}	Division	Sample

Situation

Money, fractional part spent

increase in value of English pound

part of dollar earned

per cent spent

spent by our National Government

value of coins

money orders, filling application blanks for

music, pages memorized

Bushels, bushels walnuts gathered

sticks of hickory picked

Bushels, bushels on load

granges, amount received from sale of

cost of

number used

Paper (typewriting), cost of

Papers, amount earned selling

number sold

Party, cost of Japanese lanterns for

cost of paper lats for

Pre- quency	Page and Example	Process	Classification
1	31 ⁵	Division	Purely artificial
1	93 ²	Subtraction	Sample
1	91 ⁵	Division	Purely artificial
1	193 ¹	Division	Sample
1	2 ¹	Reading	Here exercise
1	111 ⁷	Division	Purely artificial
2	175 ^{1,2}	Writing	Here exercise
1	61 ²	Multiplication of mixed numbers	Possible
1	36 ¹	Subtraction of fractions	Purely artificial
1	32 ⁵	Addition of fractions	Purely artificial
1	26 ⁵	Division	Purely artificial
1	184 ⁴	Multiplication of decimals	Purely artificial
1	70 ³	Multiplication of fractions	Possible
2	43 ⁴	Subtraction of fractions	Purely artificial
	57 ⁷	Multiplication of fractions	Purely artificial
1	99 ⁶	Multiplication of fractions	Sample
1	6 ¹	Addition	Possible
1	122 ²	Division of decimals	Sample
1	117 ¹	Division	Sample
1	117 ²	Division	Sample

Situation

Lawrent, rods needing repair

Peaches, amount needed

average price per basket

crates sold

Pencils, fractional part of gross sold

gross sold

number sold

Picnic, per cent of children unable to attend

Pictures, amount gained from sale of snap shots

cost of snap shots at camp

difference in cost of snap shots at camp

Pie, amount eaten

Playground, attendance at during summer

Population, increase in

of cities

Potatoes, amount in cellar

average rows dug per hour

Frequency	Page and Example	Process	Classification
1	104 ¹	Multiplication of decimals	Purely artificial
1	43 ²	Subtraction of fractions	Possible
1	111 ³	Division	Possible
1	20 ¹	Division and multiplication	Sample
1	31 ²	Division	Purely artificial
1	33 ³	Addition of fractions	Sample
1	76 ⁴	Division of fractions	Purely artificial
1	196 ⁵	Division	Possible
5	17 ^{4,6} 17 ^{5,7} 17 ⁶	Subtraction Multiplication Addition	Possible Possible
2	17 ^{1,2}	Addition of mixed numbers	Purely artificial
1	17 ³	Subtraction	Possible
1	32 ¹	Addition of fractions	Purely artificial
1	219 ²	Making graphs	Purely artificial
6	18 ⁶ 18 ^{3,4,5,6,7}	Subtraction Multiplication of decimals	Possible Possible
1	1 ¹	Reading	Here exercise
1	145 ¹	Addition of compound denominate numbers	Sample
3	23 ^{3,8,10}	Division of mixed numbers	Possible

Situation

potatoes, upels sold

per cent of profit on cost and selling price of

rows of weeded

total amount

Prunks, cost of

Surila, absent from class

difference in number in two schools

enrolled in school

fractional part of position money in school went

fractional part receiving bill at school

number of boys in class

number present

percentage in assembly program

total number in each school, grade, entire city

Radio, cash needed for

initially, difference in amount

Radio, doubling

Fre- quency	Page and Example	Process	Classification
4	33 ¹ 44 ² 52 ⁶ 111 ⁴	Addition of fractions Addition of mixed numbers Division	Sample Possible Purely artificial
1	201 ³	Addition, subtraction and division	Purely artificial
1	53 ¹	Multiplication of fractions	Purely artificial
1	258 ⁴	Addition of compound denom- inate numbers	Sample
1	70 ⁶	Multiplication of mixed numbers	Possible
1	181 ¹	Multiplication	Sample
2	6 ⁴ 12 ¹	Subtraction Subtraction and addition	Possible Sample
1	30 ¹	Division	Purely artificial
1	31 ⁷	Division	Purely artificial
1	31 ⁶	Division	Possible
1	79 ¹	Multiplication of fractions	Possible
1	188 ²	None	Here exercise
2	193 ^{2,3}	Division	Possible
2	5 ^{2,3}	Addition	Possible
1	211 ¹¹	Multiplication of decimals and subtraction	Possible
2	238 ^{1,2}	Subtraction of decimals	Possible
2	55 ^{5,4}	Multiplication of fractions	Possible

Situation

Rent, total for year

Ribbon, amount left

amount needed for badges

amount needed for dolls clothes

arm bands made from

leaves made from

price per yard

River, flood stage

River basins, areas of

Road, miles to be constructed

Rooms, money received from rent of

Rose plants, number bloomed

Sale, discount at

per cent of discount

Frequency	Page and Example	Process	Classification
1	26 ²	Multiplication	Purely artificial
1	36 ²	Subtraction of fractions	Purely artificial
1	107 ⁵	Division	Possible
2	156 ⁹	Multiplication of compound denominate numbers	Possible
	42 ¹	Addition of fractions	Possible
1	200 ²	Multiplication and division	Possible
2	75 ¹	Division of fractions	Possible
	125 ²	Division of decimals	Possible
1	132 ⁵	Division	Possible
1	230 ⁵	Subtraction of decimals	Purely artificial
1	1 ²	Reading	Mere exercise
1	222 ¹	Addition of decimals	Purely artificial
2	184 ^{1,2}	Multiplication of decimals	Purely artificial
1	59 ¹	Multiplication of fractions	Sample
8	185 ¹	Multiplication of fractions or decimals	Sample
	185 ^{2,5, , , , ,}	Multiplication of fractions or decimals	Possible
2	195 ¹	Subtraction and division	Sample
	195 ²	Reading	Mere exercise

Situation

Sales slips, filling out

Scales (baby), cost of

School, hours spent in

time taken to reach

School room, area of blackboard

area of desk

area of floor

measuring window in

measuring objects in

Seed, amount received from sale of clover

seeds in load of clover

price per pound of clover

weight of carload of timothy

Sheep, fractional part sold

Snow, hours spent shoveling

Soap, difference in cost of bars

Soil, cost of

Pre- quency	Page and Example	Process	Classification
8	169 ^{1, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17}	Multiplication and addition	Possible
1	97 ¹¹	Addition and subtraction	Possible
1	26 ⁶	Multiplication of mixed numbers	Possible
1	39 ¹	Subtraction of fractions	Sample
1	158 ⁶	Measuring and multiplication	Possible
1	158 ⁵	Measuring and multiplication	Possible
1	158 ⁴	Measuring, multiplication and division	Possible
1	163 ¹	Division of compound denom- inate numbers	Sample
7	142 ^{1, 2, 3, 4, 5, 6, 7}	Measuring	Mere exercise
1	132 ⁷	Division and multiplication	Purely artificial
1	127 ¹	Division	Sample
1	131 ²	Division	Possible
1	131 ⁸	Division	Purely artificial
1	31 ²	Division	Purely artificial
1	133 ⁵	Addition of mixed numbers	Possible
1	206 ⁴	Multiplication and subtraction	Possible
1	162 ⁵	Division and multiplication	Possible

Situation

Speedometer, reading

Line line, per cent of boys having perfect record

Spelling test, per cent of words missed

words missed

words spelled correctly

Store room, square feet of space in

Strawberries, left unsold

profit from sale of

Tattooing, number yards made

Tea, amount bought

Tennis court, cost of tape for

perimeter of

tape needed for

Test, difference in average score of classes

Tickets, amount forfeited on season

cost of

cost of railroad fare

fractional part sold

number sold for carnival

Frequency	Page and Example	Process	Classification
1	91 ⁴	Reading	Mere exercise
1	196 ⁴	Division	Possible
2	236 ¹ 237 ³	Division	Sample
1	124 ⁵	Division	Possible
2	182 ²	Multiplication of decimals	Possible
	188 ¹	None	Mere exercise
1	167 ⁶	Multiplication	Purely artificial
1	87 ¹	Reading	Mere exercise
1	98 ³	Multiplication of decimals	Sample
1	43 ³	Subtraction of fractions	Purely artificial
1	70 ⁷	Division and multiplication	Purely artificial
2	147 ^{3,5}	Multiplication	Possible
2	147 ¹ 147 ²	Addition Division	Possible Possible
1	147 ⁴	Addition and division	Possible
1	136 ²	Subtraction of decimals	Possible
1	108 ¹	Division	Sample
1	96 ²	Multiplication and addition	Possible
1	135 ³	Division and subtraction	Possible
1	30 ³	Division	Possible
1	125 ¹	Division of decimals	Possible

Situation

Time, fractional part spent for activities

hours, worked in given number of weeks

spent at lake

spent driving to camp

spent in office

spent in school

spent visiting friends

Tomatoe plants, per cent broken by storm

Train, feet run in half minute

Train, average cost per person on

average distance covered

days spent on

days spent on around the world

days spent on longest stretch

difference in sections covered

distance travelled on around the world

fractional part covered

Frequency	Page and Example	Process	Classification
3	62 ^{1,2,3}	Multiplication of mixed numbers	Purely artificial
1	71 ⁷	Multiplication of mixed numbers	Purely artificial
1	150 ¹	Subtraction of compound denominator numbers	Possible
2	231 ²	Division of decimals	Purely artificial
1	149 ⁵	Subtraction of compound denominator numbers	Purely artificial
1	149 ⁴	Subtraction of compound denominator numbers	Possible
1	163 ²	Division of compound denominator numbers	Possible
1	196 ⁶	Division and subtraction	Possible
1	20 ⁴	Division and multiplication	Purely artificial
1	231 ⁴	Addition and division	Possible
1	6 ⁶	Division of mixed numbers	Possible
1	231 ³	Addition	Purely artificial
1	13 ²	Addition	Purely artificial
1	13 ⁴	Reading	Mere exercise
1	13 ³	Subtraction	Purely artificial
1	13 ¹	Addition	Purely artificial
2	30 ⁴ 31 ⁹	Division	Purely artificial

Situation

Trip, miles travelled

Truck, cubic yards of sand in

Tulin bulks, number to bloom

Turkey, price per pound

Typewriting, speed per second

Typewriter, time taken to type a paper

Vacuum cleaner, cash price of

cost of

Varnish, needed for floor

Vegetables, amount received from sale of asparagus

amount of tomatoes in cans

bunches of asparagus sold

cans of peas left

cost of

difference in amount of tomatoes in cans

Frequency	Page and Example	Process	Classification
6	54 ¹ 54 ^{2,3,4,5,6}	Multiplication of fractions Multiplication of fraction and subtractions	Purely artificial Purely artificial
1	162 ¹	Multiplication and division	Sample
1	52 ¹	Subtraction and division	Purely artificial
1	131 ⁶	Division	Possible
1	124 ⁶	Division	Purely artificial
1	39 ²	Subtraction of fractions	Purely artificial
1	211 ¹²	Multiplication and subtraction	Possible
1	23 ¹	Subtraction and division	Purely artificial
1	158 ³	Multiplication of compound denominate numbers	Sample
1	98 ²	Multiplication	Sample
2	155 ^{1,2}	Multiplication of compound denominate numbers	Possible
1	98 ¹	Multiplication of decimals	Sample
1	71 ¹	Multiplication of fractions	Purely artificial
1	96 ⁶	Addition	Possible
1	155 ³	Subtraction of compound denominate numbers	Possible

Situation

Vegetables, weight of beets in cans

Winegar, number of gallons left

Violin, difference in original and sale price
 hours practiced on

Weather, record of rainfall

total rainfall

Weight, amount baby gained

average of boys on basketball team

difference in average of boys on teams

difference in carload of corn and wheat

difference in that of two brothers

rounds children gained

Wheat, weight of load

Wire, cost of for fencing tennis court
 needed for fencing garden

Frequency	Page and Example	Process	Classification
2	155 ⁴	Multiplication of compound denominate numbers and division	Possible
	155 ⁵	Multiplication of compound denominate numbers	Possible
1	45 ⁵	Subtraction of mixed numbers	Possible
1	97 ²	Subtraction	Possible
1	40 ³	Addition of fractions	Possible
1	97 ¹⁰	Subtraction of decimals	Possible
1	286 ²	Addition of decimals	Possible
2	39 ³	Subtraction of fractions	Purely artificial
	51 ¹	Addition of fractions	Purely artificial
1	6 ²	Division	Possible
1	51 ⁶	Subtraction of mixed numbers	Possible
1	96 ⁴	Subtraction of decimals	Purely artificial
1	235 ⁴	Subtraction and division	Possible
1	101 ¹⁰	Multiplication of decimals	Purely artificial
1	131 ⁵	Division	Purely artificial
1	18 ⁵	Multiplication	Possible
1	51 ⁴	Addition of mixed numbers	Possible

Situation

Wire, needed for rabbit hatch

Wood, average amount split per day

corda stacked

Fre- quency	Page and Example	Process	Classification
1	79 ⁷	Division of mixed numbers	Possible
1	82 ⁶	Division of mixed numbers	Sample
1	61 ¹	Multiplication of mixed numbers	Sample

Table IV

Showing The Frequency In Book VI
Of Types Of Problems As Explained On Page 13

Type Of Problem	Frequency
Sample	73
Fact Question	68
Mere Exercise	57
Purely Artificial	185
Possible (Improbable)	264
Real Situation	0
<u>Total Number Of Problems</u>	<u>647</u>

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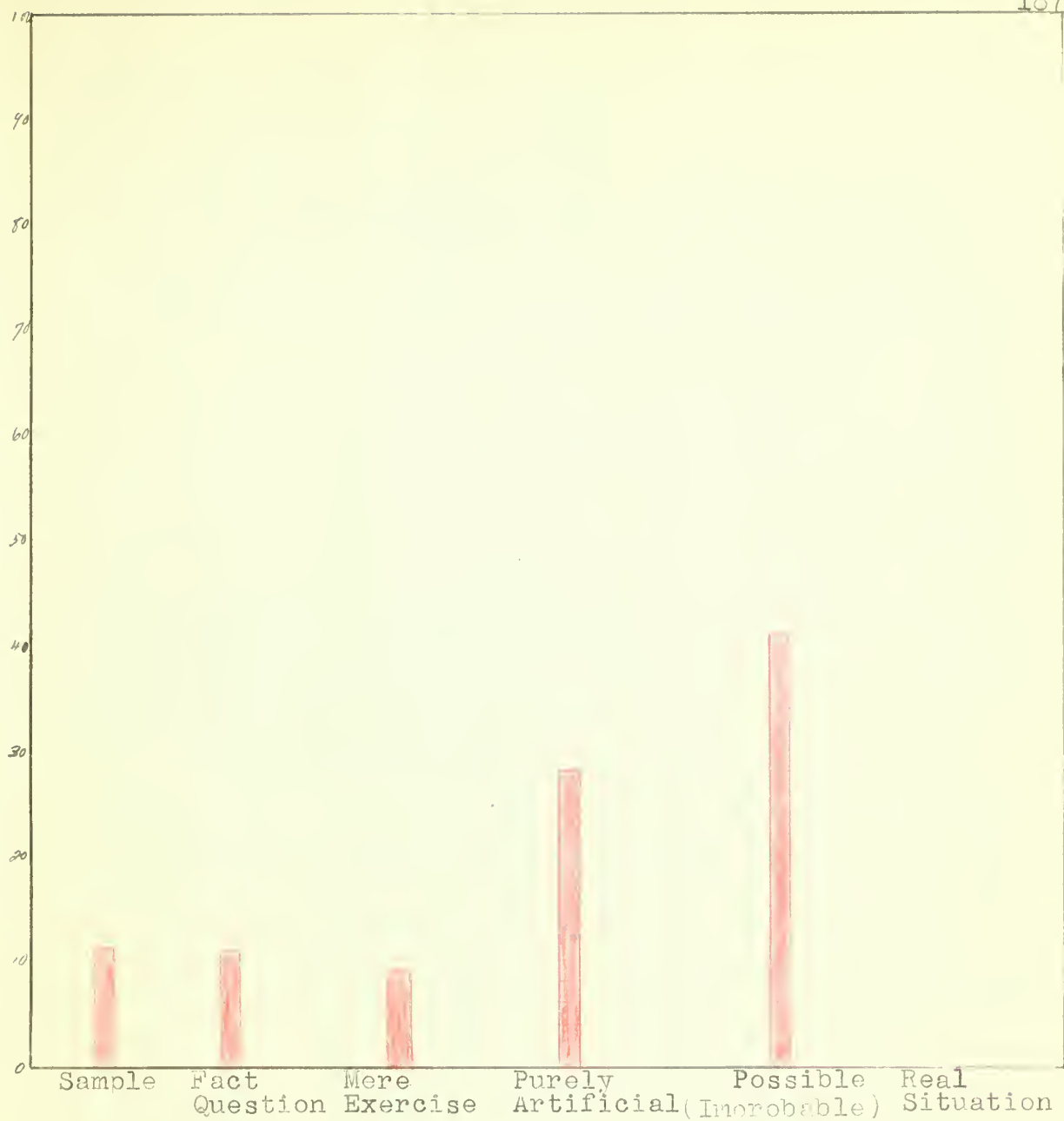


Fig. 4

Graphic Interpretation
of the Frequency of Types of Problems
in Book 6 as Shown in Table IV

Table V

Showing The Total Frequency In Books 3,4,5,6
Of Types Of Problems As Explained On Page 13

Type of Problem	Frequency in Book				Total Frequency
	Three	Four	Five	Six	
Sample	74	39	122	73	308
Fact Question	41	25	40	68	174
Mere Exercise	94	72	81	57	304
Purely Artificial	81	125	258	185	649
Possible (Improbable)	282	236	192	264	974
Real Situation	<u>6</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>7</u>
<u>Total number</u> <u>of problems</u>	578	498	693	647	2416

CHAPTER IV

DISCUSSION OF DATA

To make problems vital to children, the desire to solve them should come from within the child. This usually means that they must originate with the child. Problems may be based on the child's life experiences and within his understanding and still there may be no desire to find the solutions unless they originate in an actual need developed through immediate experience. When the child is given a list of text-made isolated problems to solve, there is usually no real desire to find the answers.

A study of Table V will show the decided lack of real situations in this series varying from six (setting up and playing a game) in Book 3, one (keeping a weather record) in Book 4, to none in Books 5 and 6. Out of a total of 2,416 problems in the four books analyzed, only seven or .29 of 1% are real situations, that is problems which require the child actually to carry out some activity. Thus, one of the criteria of problems, namely "experiences which are used to develop quantitative thinking must be associated with actual situations,"¹ is not carried out. The data presented in this table showing a decrease in the higher grades rather than an increase, indicates that this series fails to carry out the true aims of Lee and Lee, The Child and his Curriculum. D. Appleton Century Company. New York, 1940, p.415.

problem work in arithmetic.

One-eighth of all the problems in this analysis are sample problems, that is problems with the complete solution given. This in itself would not be bad, but in a great many of these, the solution is given in a purely artificial way by a process that the pupil would not encounter in real life. This point is illustrated by the following problem.

Mr. Johnson's store is near the Woodland Hills Golf Course. One day the course opened and he had 43 golf balls, or $3\frac{7}{12}$ dozen balls, in stock. He sold 15 balls, or $1\frac{1}{4}$ dozen, that morning. How many dozen were left in stock?

$\begin{array}{r} 3\frac{7}{12} = 3\frac{7}{12} \\ 1\frac{1}{4} = 1\frac{3}{12} \\ \hline 2\frac{4}{12} = 2\frac{1}{3} \end{array}$	<p>Find the least common denominator. It is 12. Change the fractions so that you can subtract. $7/12 = 7/12$; $1/4 = 3/12$. Subtract $3/12$ from $7/12 = 4/12$. 1 from 3 = 2. The remainder is $2\frac{4}{12}$. $4/12 = 1/3$. Mr. Johnson had $2\frac{1}{3}$ dozen of golf balls left.</p>
---	---

What merchant would ascertain the number of golf balls left in stock in this manner? He probably would merely count them.

Generally one thinks of a sample problem as a guide for the solution of following problems of a similar type. In these texts the sample problems are generally followed by drill examples, thus mixing problems and drill, using the problems purely for drill, not for further problem work. This in itself tends to make all problem work artificial.

The fact questions and mere exercises carry little weight on either side of this discussion, as the former involve simply putting down in part or whole rules learned, and the latter

require no arithmetical computations. Both types merely provide drill.

The real aim of problem work in arithmetic is to prepare children for adult life by developing "business judgment, and this means for each grade, the careful planning of a few appropriate units that can be profitably developed on the basis of community and personal experience."¹/ That this book has attempted to fulfill this aim is shown by the title, Child-Life Arithmetics. The preceding analysis shows that twenty-seven per cent of the problems presented are pointless and put in the book purely to provide an opportunity for certain figuring, and are classified here as purely artificial. (See sample p.14.) When the child is asked to solve more than one-fourth of the problems (649 problems; see Table V, p.188) in a way not encountered in real life, he certainly is not being trained to use good "business judgment."

The problems classified as possible have caused much controversy in a seminar group. Some say that they are purely artificial. This is true if they are used as they are stated in the textbook. The classification "possible" may be reviewed to advantage at this point. (See p.15.) A problem classified as "possible" is a type which requires the child to figure on a situation which might be within his understanding and which he may encounter in real life. Two features of worthwhile problems are that they are based on life experiences of the

¹/Guy M. Wilson, "The Useless Problem Grind," Education (April, 1941) p.451.

of the child and so are within his understanding. The following example illustrates a typical problem under the classification:

"Mary bought six handkerchiefs for \$1.00 and a blue scarf for 39¢. She handed the clerk two one-dollar bills. How much change should she receive?"^{1/}

This problem is within the understanding of a great many children and is based on a life situation, namely buying wearing apparel. This problem if given to the child along with the other isolated problems on the page (page 20, Book 5, Child-Life Arithmetics) as most teachers do, is purely artificial. However, it is possible in that the situation is one that might occur in a worthwhile problem unit. In short, in this analysis I have taken problem situations which under certain circumstances might occur in worthwhile problem units and classified them as possible, whereas as they stand, they are purely artificial and improbable.

Some of the problems that fall under this classification may be turned into real situations if handled correctly by a skillful teacher. In the textbook approach to real problems, the teacher selects problems from her textbook which involve situations that are adaptable to worthwhile problem units suited to her class and locality. She develops a few of them into real units. Some of these units will take a week or more to develop. Never would four or five per day be assigned.

Here is a list of the situations that occur under the

^{1/}Woody, Breed, Overman, Child-Life Arithmetics. Lyons and Carnahan. Chicago, Illinois, 1936, Book 5, p.20, Example 13.

classification of "possible" in Book 5 of the Child-Life Arithmetics Series.

Age, difference in, between sisters
 Attendance, average for week
 Bank, amount deposited in
 Bedroom, square feet in
 Book, number of pages left to read
 stamping name of school in
 needed for each pupil
 Cakes, bought for school party
 Camp, total expenses at for scouts
 Candy, amount made
 cost of for party
 Cloth, needed for aprons
 needed for costumes
 needed for doll's dresses
 Clothing, cost of
 finding the difference in original and sale price
 Cookies, baked for school party
 cost of
 shared equally
 Cost of items listed
 Days, number before birthday
 Diagrams, drawn to scale
 Dog, cost of collar for
 Eggs, collected
 sold
 Food, cost of
 Gasoline, average miles per gallon
 cost of
 gallons needed for trip
 Hats, difference in cost of two
 Height, difference in of children
 Ice cream, cost of for party
 Lace, needed for trimming doll dresses
 Lemonade, sold
 Library, amount needed to purchase books for
 carrying books to class rooms from
 number of books in good condition
 Lunchroom, pupils eating in
 Magazines, difference in cost of
 Miles, average driven per day
 ridden on bicycle
 Milk, cost per month
 Money, amount earned
 amount needed to purchase articles desired
 amount of change received
 amount put in bank
 amount school banks per week
 difference in amount rooms bank

Money (continued)

saved for basketball game
 total amount had
 value of coins
 Motion picture show, expenses of shared equally
 Nuts, boxes sold
 Oranges, cost of
 Papers, sold by class
 Parade, pupils marching in
 Peaches, cost of
 Picnic, children attending
 food class brought for
 Presents, cost of
 Quilt, pieces for
 Radio, school wants to buy
 Radishes, amount earned from sale of
 Reading test, difference in scores on
 Recipe, increasing and decreasing
 Roses, cost of
 Sap, amount of syrup from
 School garden, number of stakes needed for
 School orchestra, amount of money raised by boys in
 School picnic, bus fare to take children on
 School supplies, number of tablets bought
 Skis, cost of
 Soap, cost of
 Spelling, average score on test
 Stamps, cost of
 Store, selling at grocery
 Tickets, amount received from sale of for school program
 cost of
 Time, minutes train is late
 spent in school
 spent studying
 Track, difference in length of
 distance run per minute
 Trip, cost of tickets for
 expenses shared on
 miles traveled on
 money saved for
 Vegetables, amount earned from sale of
 Weight, number of pounds underweight
 pounds gained

This list shows a variety of situations included under the heading of "possible." A similar list can be found in each of the other three books. Selecting a few of these situations at random, I will show how some of them can be used as a start on

problem units that will be real and vital to the child.

There will be six girls dressed as butterflies. Each butterfly costume takes $1 \frac{3}{4}$ yards of cheesecloth. How many yards must the school buy for all six costumes?

The fifth grade might be giving a play and they might need to buy materials for costumes. The class would have a discussion on the amount of cloth needed, cost of material, and type of costume needed. This situation would then become real to the children. The figures would have to be changed to fit their needs, but the situation would still be the buying of cloth for costumes, and the class will have worked out a small problem unit.

Our library teacher examined 1178 books in the school library and found that 118 needed to be repaired. How many books were in good condition?

As stated, this problem is not of interest to the child. However, if the class had a library in its room, the children might want to know how many books were in good condition and how many books needed to be repaired and rebound. In this case the children themselves would act as librarians and take complete charge of the library. Again the figures would have to be changed to meet the needs of the class. Many other problems would arise, such as cost of repairing the books, new books needed, and cost of same. How interested the children would be in working out a problem unit on their library and how real this situation would be to them!

Mrs. Gray orders one quart of milk a day. Every two days she orders $1/2$ pint of coffee cream. The milk costs 11¢ a quart and the cream, 18¢ a half-pint. What is Mrs. Gray's milk bill for September?

A very worthwhile problem unit on milk has been carried on by Miss G.L. Welch.^{1/} This situation could be used only in schools where milk is sold. Instead of figuring Mrs. Gray's milk bill for September, the children might figure the cost of milk for the school for one week. There are many interesting experiences that can be developed as a result of such a unit, such as making out forms, receipts, and keeping record books. This could also lead the child to figure the monthly milk bill for his family.

Last Saturday Ted earned 75¢ cleaning snow from a neighbor's walks. He earned \$1.05 by selling popcorn balls and 65¢ selling "The Saturday Evening Post." With some of this money he bought a season ticket to the ball games at school for \$1.75. How much did he have left?

Earning money and making actual reports on it is a unit suggested for grade five.^{2/} The name and the figures would not be the same for each child in the class, but each child would be solving the same situation and type of problem.

Fred had three spelling tests this week. Each test had 20 words. In the first test Fred spelled 17 words correctly. In the second test, 15, and in the third test, 19. What was his average?

^{1/}G.L. Welch, "A Fifth Grade Informal Problem Unit in Arithmetic on the Ordering and Distributing of Milk in the School," Education (April, 1941) p.458-464.

^{2/}G.M. Wilson, M.B. Stone, C.O. Dalrymple, Teaching the New Arithmetic. McGraw-Hill Company. New York, 1939, p.311.

Children are always interested in their marks on tests, especially to see if they have improved. Keeping a graph of their marks and averages would be a real situation to each child and is also a suggested unit for the grade.^{1/}

This textbook approach to real problems, although not the best, is far better than the all too common habit of assigning a given number of isolated problems to be completed in a given time. It should only be used in schools where a teacher's "hands are tied," so to speak, and she must follow the textbook assigned to her. In such a school the teacher could still carry on worthwhile problem units, and if necessary, prove that she was following the book by turning to the problems in the text upon which the units are based.

The best and correct approach is for the teacher to start with her community and find problems of the locality that the children are acquainted with and base their units on those situations, thus making them real to the children and helping them to form good business judgment. The two types of real problems are: 1) The basic problems common to all, such as keeping a budget, saving money, buying clothing, and purchasing a car; 2) The local problems, such as the wheat farming in the West, cotton crop of the South, and the roadside stands of New England. Note one further illustration of the difference between an artificial problem and a real one.

Suppose a class were asked to find the cost of screening

^{1/}G.M. Wilson, M.B. Stone, C.O. Dalrymple, Teaching the New Arithmetic. McGraw-Hill Company. New York, 1939, p.311.

in an open porch of given dimensions with screen wire at a given cost per unit. In general, children of fifth or sixth grade would know the meaning of screening a porch. Many have sat on screened porches and heard the buzz of mosquitoes on the outside. There are sections of the country, however, where screened porches are not common and some of the children in this section probably have never seen a screened-in porch. But a general understanding of the problem does not motivate its solution. There was a real problem and true motivation, however, for two boys who proposed as their problem work for the week, the finding of the cost of screening in an open porch on which they wanted to sleep and had tried unsuccessfully to sleep. The problem continued into a second week and then a third as the boys made dimension drawings for bids, debated between black wire and copper wire, and finally decided on sections that could be taken down and put under cover in the winter. Here was a real problem that grew out of the needs of the children. It was real experience. It illustrates problems that are real instead of artificial. They grow and develop. They are not assigned.

CHAPTER V

CONCLUSIONS

The Child-Life Arithmetics was chosen as a basis for a study of textbook problems in arithmetic because it is one of the most recent series (copyright 1936), because the introduction to the series promised a modern progressive viewpoint, and because the leading author (Woody) has had a major interest in recent years in research in arithmetic. As the work began, there was hope that at last the pupils were to be released from the traditional problem grind for mental development.

The work closes with keen disappointment. In the four volumes, totalling 990 pages, 2416 problems were found, but not one truly functional problem unit, and only seven that could be characterized as based upon real experiences.

From this analysis the following conclusions may be drawn:

1. Textbook problems show a decided lack of real situations or problems which would train the child to use good business judgment.
2. Textbook problems are definitely subordinated to processes.
3. Each book in the Child-Life Arithmetics Series presents processes which are one to three grades in advance of

the grading of these materials as set forth by Washburne.^{1/}

4. Problems are presented requiring the child to do figuring in decimals and fractions, such as, according to Dalrymple,^{2/} are quite beyond common usage.
5. In these textbooks there is no definite distinction between problem work and drill.
6. In this series problems of the catch and puzzle type are included, which is contrary to the modern trend.
7. The situations presented far exceed those the child will ever meet in real life; according to Wilson^{3/} few adults encounter as many as 100 different problem situations.
8. The authors of this series do not suggest any functional problem units to be carried on by the teacher. There are cases where the alert teacher might develop worthwhile functional problem units starting with the problems in the book.

The authors in this series have made a sincere attempt to improve problem work and have made some advancement in offering problems which, in general, are within children's understanding. Still much more must be done to meet the following

^{1/}G.W. Washburne, "Report of the Association on Grade Placement," N.E.A. Department of Superintendence, Book 4 (1926).

^{2/}C.O. Dalrymple, "Fractions in Business." Doctor's Dissertation, Boston University, 1934.

^{3/}G.M. Wilson, M.B. Stone, C.O. Dalrymple, Teaching the New Arithmetic. McGraw-Hill Company. New York, 1939, p.303.

aims of written problems:

"Objective thinking in terms of real life

Interpretation of real situations when encountered

Ability to apply and use number work when it is needed."^{1/}

To carry out these aims a teacher certainly cannot assign the textbook type of problems to her pupils. Rather she should carry on well-conceived functional problem units which meet the needs and experiences of the pupils in that particular community and grade. These problem units require a great deal of preparation and planning on the part of the teacher and develop within the pupil the ability to attack problems of adult life with an open mind to all angles of the situation. The teacher especially must do a great deal of preparation and planning on the unit the pupils are undertaking, as she has to guide them skillfully through their task. If Dewey's^{2/} statement that arithmetic beyond the fundamentals is primarily economics, is correct, then the carrying on of these well-conceived problem units will guide the children to use good business judgment in real situations in adult life.

^{1/} G.M. Wilson, M.B. Stone, C.O. Dalrymple, Teaching the New Arithmetic. McGraw-Hill Company. New York, 1939. p.295.

^{2/} John Dewey, The Sources of a Science of Education. Kappa Delta Pi Series. Liveright Publishing Corporation. New York, 1929.

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